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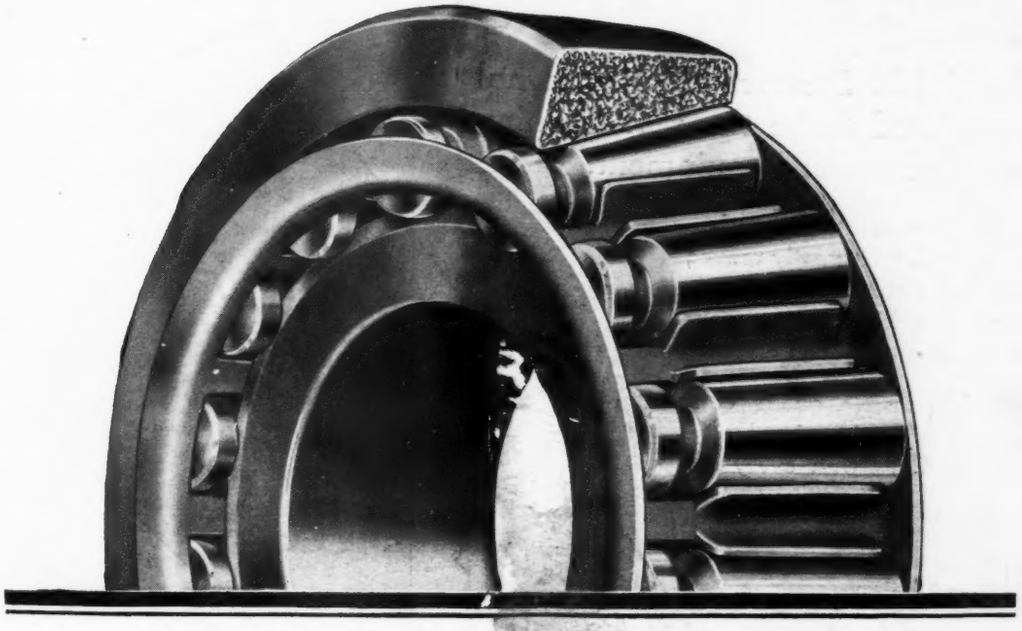

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THE TIMKEN ROLLER BEARING CO., CANTON, O.

Timken Tapered Roller Bearings for Passenger Cars, Trucks, Tractors, Trailers, Farm Implements, Machinery, and Industrial Appliances.

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Model 136 Stewart Electric Signal is considered to be the real warning signal for standard equipment.

Radical changes in our manufacturing methods will greatly reduce manufacturing costs. Its tremendous popularity will increase quantity production to a large extent.

It will be possible, quality considered, to offer this signal at a price to conform with every car maker's requirements. Its characteristic excellence will be retained. It will meet the approval of every car factory engineer.

Car manufacturers about to give consideration to 1921 electric horn equipment will find it advantageous to reserve decision until visited by our representative.

Stewart-Warner Speedometer Corp'n

Chicago, U. S. A.

AUTOMOTIVE INDUSTRIES
The AUTOMOBILE

VOL. XLIII NEW YORK—THURSDAY, DECEMBER 30, 1920 No. 27

The Right Method of Selling Cars on a Buyers' Market

The ideas gathered under this heading are intended to be helpful to those who have been caught unawares by the changed conditions. They are based solely on a consideration of the mass selling system.

By Clyde Jennings

IT is, of course, admitted that the problem of motor vehicle sales is entirely changed. From a sellers' market, it has turned to a buyers' market. This puts before the manufacturer a problem which has not seriously concerned him for several years and one that he did not expect to confront for another year or two. In the main, manufacturers admit that they had not reached a conclusion as to how they would handle the problem when it arrived. We have talked with several sales managers within the last few months who were contemplating the situation, which they regarded as being in the future. The plans of these men were not reduced to anything like detail.

The manufacturer is confronted only with the problem of mass selling. He does not and cannot sell his product in single units. He does not come into direct contact with the public. His customers are his dealers and his duty, in creating a demand, is to his dealers.

Consequently, his first problem is that of forming a dealer organization. This organization must be the outgrowth of a careful consideration of the number of units to be produced; the territory over which they can be marketed with profit to himself and the dealer. This is a considerable problem and it is not the intent to make it the subject of this article.

His second problem, which becomes important as soon as the first has been outlined, is that of creating a sentiment or a demand for his particular product.

This problem quickly resolves itself into two distinct branches:

1. The trade appeal, to the buyer, which will include the obtaining and proper influencing of the men who are to become dealers, or who already are factors within the trade who might be called upon to speak well or ill of the product.

2. The general appeal to the user, who lives in the communities where the dealers are located. The user is not a direct customer of the manufacturer, but the custom of the trade has created a sentiment that the manufacturer should do much of the work of creating the user demand, even to the extent of printing advertisements in newspapers to bolster sales in weak spots. The entire financial arrangement of the trade, fixed by the distributer and dealer discounts, is based upon this method.

Consequently the burden of the advertising is placed upon the manufacturer. Whether that is as it should be, is not the object of this discussion. The question of dealer allowance for advertising has been discussed within the trade, but there is no settled practice and, we can say, really no average practice. Neither is there a basic idea of the percentage of retail price used for advertising, as in some other lines of trade. The entire advertising problem appears to

be an open one. With this general premise, we are endeavoring to offer some thoughts as to the advertising of motor cars, which are the prominent item of our trade as far as advertising goes. The remarks will, in a general way, represent ideas on truck advertising as well.

It is no secret that the spending of the advertising appropriation will be along very different lines from that of the last few years. The premises by which this conclusion is reached are sufficiently well known as to need no further discussion.

It is very true that many manufacturers and some sales managers approach the advertising question with a feeling that there is something mysterious about it. Very few men have ever stopped to carry advertising back to its primary statement. If they would do this, much of the mystery would disappear. One of the men who helped materially to make advertising a real business gave this definition.

"Advertising is making a good impression on the prospect."

With this statement of the purpose of advertising as a means to mass selling, it might be well to state on what basis the success can be measured. Here are two expected results that can be used as a measure. Advertising should

A Lessen the cost of sales.
B Increase sales.

Now if the manufacturer will consider this simple and basic statement of the purpose of advertising and how it may be measured the mystery will be eliminated.

The problem then remains as to how to make this impression. Several questions suggest themselves in this connection. If they are answered, the problem is about solved. Let us list the more important questions:

1. Who are prospects?
2. Where are the prospects located?
3. Do they read; if so, what and why?
4. If they do not read, who reads for them?
5. In case of the motor car purchase, who has the greatest influence?
6. What do the prospects want to know about my car?
7. What do I want the prospects to know about my car?
8. Are the former buyers still buying?
9. Why did I make the car, anyway?

With the answers of these questions at hand, the dealer layout completed, and the amount of the appropriation fixed, it should be comparatively easy to settle the entire question of advertising. But these questions are a serious factor, and to answer them hypothetically is the object of this article. So let us take them up in order.

1. Who are the prospects?

There are two, of course, dealers and the users. The dealers are the first and immediate prospects of the manufacturers. No matter whether he is a new manufacturer, or an old manufacturer merely changing models or prices, or a manufacturer seeking to sustain the respect of a continued model, he has a distinct problem to present to his dealer prospect.

While reaching his dealer, he must also reach the influences that bear heavily on the dealer, in other words, his competitors and associates. Also he must counteract the influence of rival manufacturers. It might be an axiom that a dealer can sell a car only as he is sold on it himself.

This dealer element often is overlooked by manufacturers. In fact, we believe that most manufacturers overlook the necessity of selling the influences that are brought to bear on the dealer. Some way they appear to consider that once a dealer signs a contract to sell a car that it naturally follows that he remains an enthusiast for that car and that he will influence his own surroundings. A good guess is that such dealers are rare.

The other prospect is the user. The manufacturer seeks to influence the user because it is of profit to himself to send the prospective user to the dealer partially or entirely sold on the car he makes. There may come a day when the manufacturer will content himself with advertising to the dealer and will let the dealer handle the user advertising on his own account. That is done in some lines of merchandise with less waste than would accrue through the handling of user advertising from the factory. Especially is factory advertising likely to result in waste when a car lacks national distribution. The user prospect can also be classified by the price of the car and the medium selected to fit the case.

2. Where are the prospects located?

This question should be answered definitely. First outline the territory in which dealers are to be located. Then outline that territory in the advertising put out to develop the dealer organization. So it should not be hard for any straight thinking factory sales organization to answer this question.

Next, the user prospects live in the same communities as the dealers. This must follow, just as day does the night. The most absurd thing I have noted during the past year of advertising absurdities was an advertisement in a publication of 10,000,000 (more or less) readers. The advertisement was of a very moderate priced car, made in a factory that could not possibly produce more than 2500 cars a year. Just think of it!

One car, priced somewhat lower than this one, has 4000 dealers in this country and we know that their distribution is not really and truly national, although it might be said to be practically national. A comparison of national advertisers with production would be amusing in many instances if it were not for the appalling economic waste. For economic results, the circulation used must be fairly confined to the localities where the cars may be bought.

It is true that cars have a tendency to wander into other localities, and that brings up a question that we will take up later.

Carrying to completion the idea that the manufacturer needs advertising in the general media for national advertising, then it must follow that he needs all such media. The line of distinction between such media is very thin.

3. Do the prospects read; if so, what and why?

It is pretty well conceded that the prospects of both classes read something, but the question is what and why they read.

It seems that in the past few years advertisers were obsessed with the idea that everybody read nearly everything and at least everybody read one medium.

Recently an advertising manager of a concern that comes within our industry told his fellow advertising managers that 43 per cent of his dealers read his advertisements printed in a general medium. This sounded pretty good for this medium but later, in the round table discussion, he said that it had required three years of hard, expensive work for him to attain that average. And he remarked, "I will never undertake such a task again."

Now it happens that the dealers in this man's line are a progressive group, pretty well up with the times in their line. It is not hard to believe that this man could have picked a business paper that more than 43 per cent of

them read at the start. In fact, this man practically admits that this is true.

There has been a considerable success in advertising small articles and by this method creating a demand that has placed them on the shelves of general retail merchants. This success has led some car manufacturers to attempt the same thing. We could write into this story details of considerable wasted effort along this line. Motor car dealers, as a rule, are limited as to the number and makes of motor cars they can sell by their contracts for their major line, and it is not to be expected that, when some one drops in and asks for a Sennett car the dealer will order a few and put them in stock.

Now consider the user prospect. What publications does he read and why does he read them? Do you honestly think that the tired business man is going to read seriously and carefully an engineering advertisement when he is seeking relaxation in fiction? If a publication boasts openly of the number of lawyers and doctors who read the publication, is it reasonable to expect that these doctors and lawyers will go about and advise the husbands of patients or the patient, if he happens to be a man, to buy this or that truck because he saw it advertised in the paper that he reads?

There was a very popular book a few years ago entitled "Put Yourself in His Place." I do not remember much about the story, but I do recall the title and I have tried to settle many questions by putting myself in the other man's place. I have watched the women in my own home and those homes in which we visited, and questioned them as adroitly and innocently as I know how to learn why they read the papers and magazines. The results are not encouraging to the motor car advertiser. There was another book called "Looking Backward." Sometimes it is very wise to review the past advertising efforts and learn of direct results.

There are certain more or less accurate tabulations that tell where the people live who read certain publications and also what class of people read them. But why these publications are read is not tabulated. Think it over.

I once heard an advertising manager assert something like this: "Get on a parlor car train leaving this city on Thursday evening and you will find all of the men reading a single publication and reading chiefly the advertisements in it." I thought that a strange statement. The next evening being Thursday and as I was leaving that city on a parlor car train, I made the canvass. The name of the publication had not been mentioned, but I had a suspicion as to its identity. I saw one person reading the publication, and that was a girl. She was reading fiction. In two trips through the train I found serious-looking men reading material they were taking from portfolios more than any other single medium. This was on the later trip. On the first, they were reading the news pages of newspapers.

4. If they do not read, who reads for them?

Of course this means, if the prospects do not read motor car advertising, who reads it for them?

Honestly, we believe that few persons do read motor car advertising with the thoroughness that they are supposed to. We believe that what they read is chiefly suggestions and then they go to some one in the trade to get an interpretation of it. We believe that motor car advertising should be designed with this idea in view. It is not fair to expect that any single advertisement, or series of advertisements for that matter, will be entirely convincing to a novice. It would appear that the advertiser has it in his power to send the user to the dealer and then the dealer and his assistants must read the real facts and pass them on to the user prospect in language that he or she can understand.

Did you ever stop in a garage long enough to hear the man who drives a car in for some repair call the garage man Jim and ask him what he thought of the Sennett car? Now how much reading was Jim doing for this man who probably was just then thinking of his next car? Jim might have answered from his own experience, but it usually happens that a man's experience is influenced by his information. If Jim knew all about the Sennett car before he started to repair it, his opinion would probably be very complimentary; if he knew nothing about it, he would have an awful time repairing it and would form a very adverse opinion.

The more you think of this question as to "Who reads for them?" the more interesting it becomes.

5. In the case of the motor car purchase, who has the greatest influence?

There was a period in the piano trade that the sale was decided by the fee handed to the music teacher, or by the music teacher's honest opinion. In other words, the music teacher was the greatest influence. That is not the case now. Financial terms first won the people from this practice and when that change came the dealers so strengthened their appeal that they to a large extent became masters of the field. It is worthy, perhaps, to note that piano makers are not exceptionally heavy national advertisers, but that the dealers employ many "bell ringers" or solicitors who are frankly hunting prospects in connection with much newspaper advertising, usually financed by the dealer.

The story as to influence on sales might well be a long one. We do not know exactly who can answer it, but we have heard some incidents recently that might indicate something toward this end. A man we know bought a car that has been quite popular west of the Alleghanies, but is little known in and near New York. His wife drove this car to the service station near her home in a New Jersey suburb. The service man, something of a power in that neighborhood, looked it over and remarked: "Looks like you paid enough for that carriage!" Imagine the tone of that remark and then what the woman thought! Really it was necessary to sell this service man on the car if it is to stay in that neighborhood.

It is quite evident, however, that few persons telephone an order to a salesroom for a car. Such cases are heard of, but you know from the spirit with which such incidents are told that they are entirely unusual. So it must reasonably be concluded that the dealer and his staff have quite a good deal to do with the sale of the car.

Once I heard a salesman speak very severely of a rival car that I thought deserved better words. After the customer was gone I asked him if he was not a bit hard on the car. He answered that he "didn't know anything about the car, as it never advertised. If the makers are ashamed of the car, why should I stand up for it?"

The truth is that this car was quite well advertised, but not in the papers which this salesman read. His reading was almost entirely confined to trade papers and newspapers. His idea was that if the makers of the car were ashamed to tell what was in their car, he had the privilege of taking liberties with his description. Not the right spirit, you will say. But it is a condition, not a theory.

There are other factors to be considered which might be included in the advertising idea. I once knew a dealer who was about the most disagreeable man I can

recall. He exerted himself to be disagreeable to his fellow dealers. But he was a wonder on service and he had working a system whereby most of his owners left their cars at his service department for inspection at regular intervals. It was the best thing of the kind in that town, but he got no recognition for it in the dealer circles. Instead, when driving a prospect about, the salesman would point to the line of cars outside this service station and say: "You see what happens to —— cars." There came a time when this man kicked himself out of the dealer organization of his factory. His successor radiated good fellowship and within a month the finger of scorn was no longer pointed to this line of cars waiting for inspection.

Did you ever think well on how closely the social position of the purchaser is connected with the car? If you happen to be invading a new sales territory with your car, especially if it is priced to appeal to most liberal buyers of that community, you must realize that your advertising in that community must justify the purchase for the family. It is especially important that the lady of the house feel entirely contented with her purchase. She will not pay $5,000 for a car and then go out each afternoon and justify her purchase. When she puts that amount of money into anything she wants the name to justify it for her, practically to make her neighbors arch their eyebrows a bit when they hear the name of the car.

How are you going to do this? You must determine first what this particular set of people read. It always is a fact that the people of the "same set" in any community have a common reading medium. Perhaps it is the local society paper. In one community I know it happens to be a paper called "The Mirror." Few persons outside of that community know this paper. But the dealer who plans to invade the smart set of that community should know it. This particular paper is well conducted. Its advertising appeal is honest. Its managers know well their sphere and they demand pay, not for the space or for the circulation, but for their reader influence. There is, likely, no other single paper that circulates so universally in this especial circle.

These are merely suggestions as to the ramifications of "influence." How to make the best use of this influence is sometimes called an open question. Frankly, we do not believe that it is. We think the answer is to properly use the publications that reach and affect this influence. Use it in an educational way. Talk to dealers and garage men as though they knew something about your product, not in the language used to reach the prospective owner. These men likely know the defects of your product, so when you overcome a difficulty why not say so? Talk dealer points to the dealers, service points to the garage men, user points to the user.

6. What do prospects want to know about my car?

The best answer to this question is indicated by the questions asked of the salesmen when they talk to prospects and by the part of the sales talk that has the most effect in swinging sales. Base your consumer copy on these points. If most people want to know if this car will take them to the beach in swimming clothes, by all means tell them that it will and print such pictures. But if the people want to know how fast it will go, its normal speed, what is the cost of upkeep and about the service you are going to render, by all means give them this information. If they want to know how many miles or years compose the average life of your car, tell them that from your records. If you are appealing to women who buy a car to uphold their social position, tell them of the intimate adornments, the upholstery, etc. By all means let them have the points on which they can justify the purchase for the purpose for which the car was bought. Also let their friends know these facts.

7. What do I want prospects to know about my car?

Certainly there are things about your car that you want the public to know. Tell them these facts. You know best what they are.

8. Are the former buyers still buying?

If we did not have anything else to put into this number of AUTOMOTIVE INDUSTRIES, it could easily be filled with this discussion. It means just this:

Are you going to keep on buying new customers for every car you make, or is each car you make going to be an asset? If the cars you have made cannot be listed as assets, they become liabilities. There is no neutral ground.

Every car turned out should be a contributing asset during its entire life. As long as it is listed in the State registration list, the man who buys the plate should be paying your organization real money for service earned. Every car that you send out should become, in time, the source of sales for parts and service to a satisfied customer. Of course this owner should get a period of perfect service, but no reasonable owner will expect a car to run forever. He expects sooner or later for some of the parts to give way and he will be glad to replace them at the right price—a price that means a profit to you and to your agents. If you have 100,000 cars running, you should have a nice business in keeping those cars running.

An automobile should be a very fine sort of an advertisement. Every once in a while a man hires an automobile and puts a sign on it to advertise a meeting, or a bargain sale. At the same time he is advertising the automobile.

This idea assumes that it is a good automobile and has been well serviced. If it is not a good automobile and has not been well serviced, then it becomes a liability.

A few years ago the player piano dealers of a Western city held a meeting to talk over employing a man to run a central store to sell music rolls to the owners of the instruments they had sold. They called in a young man who had experience selling talking machine records. He listened to their plan, then said, "Why hire a man? I'll take it over and pay you all to stay out of the business for ten years." This thought was so startling to most of those present that they went home to think it over. As a result of the suggestion each piano house put in a music roll department. The profits from one such department the second year after this meeting reached five figures. A few motor car concerns have properly promoted their service departments, but not many of them.

It is going to be mighty expensive to some car makers to buy new customers if the former owners are all turned into knockers. Use advertising copy to make the former buyers all boosters. Remember always, that a good many people think what they are told to think.

9. Why did I make the car anyway?

I used to think that every man who built a car had some specific reason for doing so; that there was something about his car that he did not believe the others had. Lately, I have come to doubt that all cars are founded on a specific reason. Perhaps some are just cars because the maker believed that he could sell a vehicle. If you cannot answer this question pointedly, it would be interesting to know why you are in business.

The motor car business has been through a considerable strain since 1914, and the one big point that I see in all of this is the necessity of the manufacturers to justify their vehicles as a necessity. Really, when the big fuss began I could not see why any one should question that "transportation" was a necessity. But they did! It became a condition, not a theory.

We want to pay our compliments to the men who presented this defense in Washington and in other places. But while this work was going on, there were a number of stay-at-homes, who sat in their offices and devised advertisements that reduced all of the arguments made in Washington to "scraps of paper." Now the industry is confronted with the serious questions of added taxes.

Are these same slackers going to stay at home and write "pleasure" car ads while the real leaders of industry fight in Congress to establish the necessity of the best means of transportation ever offered to the public!

Cars should be advertised in their best use. We admit that cars are a necessity, why not sell them as such?

E. C. Tibbitts, advertising manager of the B. F. Goodrich Rubber Co., is on record as saying to the Advertising Managers' Council of the M. A. M. A. the following:

We are not getting out of the car one-half, not even one-fourth, of the real utility that is in it. Here is a willing slave, as wonderful as the magic of Aladdin's lamp, a saver of time, annihilator of distance, a destroyer of drudgery, and here we are hesitating, still gaping at the wonder of it, hardly realizing the miracle of it, and not really beginning to realize or utilize the full value of it.

I, personally, would appreciate reading an advertisement that would really wake me up to the utility of the automobile. I don't get anything like the real value out of this remarkable servant of mine. I'd like to see an advertisement right now which would feature the many and diversified things the man or woman can do with an automobile, the usual things and the unusual things, and the thousands of things that a car can do for a man or woman.

I would like to see advertising that would picturize an automobile in its diversified uses.

I would like to see an advertisement featuring a machine in which the busy business man is hurrying to catch a train.

I would like to see an advertisement picturing a housewife as she meets her friend at the railway station.

I would like to see the housewife depicted as she goes to market in her machine.

I would like to see the family represented buying produce direct from the farmer.

I would like to see the young man in a snug roadster with his best girl driving over the moonlit roadway.

I would like to see advertising that would feature touring in all its wondrous beauties, the automobile at the side of the stream, its owner fishing; an automobile beside a lake, the canoe in the distance; an automobile hunting scene; the whole family in a camping scene with the automobile in the foreground—these and a hundred other pictures that would lend some idea of the untold utility of the automobile.

I would like to see an automobile plowing through the snow, the street-cars stalled.

I would like to see advertising picturization of the various uses of the automobile on the farm. Why, you could take the camera and get the setting of a dozen advertisements in almost any rural part of America in a day.

I am not saying that all this hasn't been done. It has, but only in a limited way. What I want to see is automobile advertising as a whole turned in the direction of automobile utility, for my theory is that charm and beauty and reliability and luxury in themselves already have been pretty well sold. Keep on selling, but why not stress utility in every advertisement?

Is this idea worth considering?

Just a few words about advertising as a general proposition. We have said in this article about a social publication that its owners charge for the influence, for the entry that they give their advertisers to their special circle of readers. I will say, further, for them, that they are jealous guardians of what they present to that circle. The ability to pay the bill is not by any means the qualifications for advertising in that paper. Their platform is about this, as I recall it:

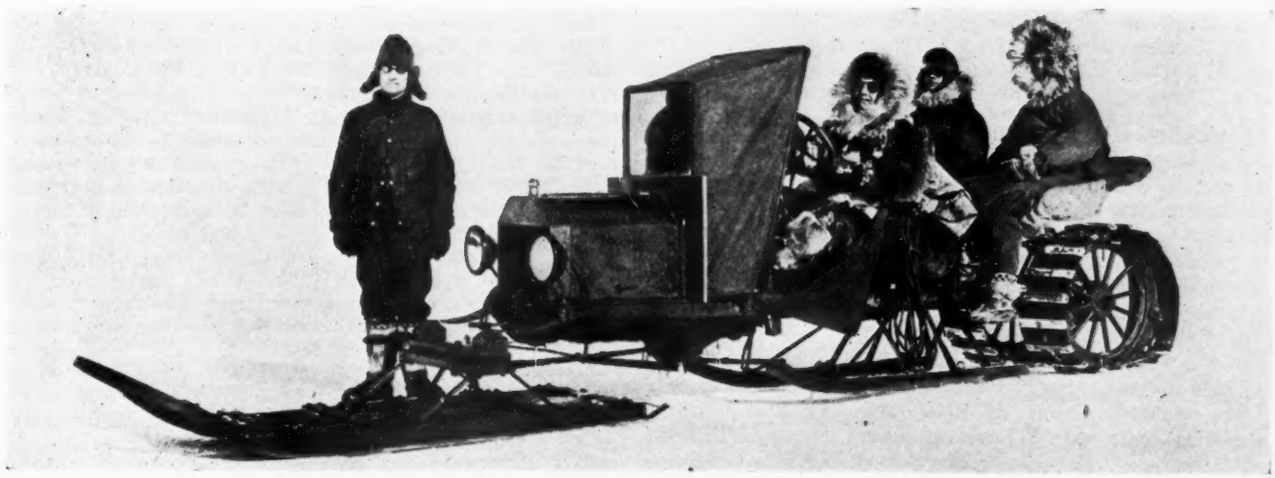
The firms and product must be honest.

We must be convinced that it will be profitable to the advertiser.

We must be convinced that they will treat our subscribers as well as we treat them.

This may be considered by some as a high handed proceeding, but it is the spirit of the better advertising, the real advertising that is making an actual business out of advertising. There are still in the business a few of the old space buyers and space sellers, but they are getting fewer daily. The good advertising business men realize that they are selling the influence of their publications and that this influence is a thing to be carefully guarded, much like the good will of an old, established business; the reputation of a lawyer, an engineer or a doctor.

If you think well of your car, be careful in what publications you advertise it. Some advertising is merely notoriety.



One of the many uses to which a modified Ford can be put. A motor driven sleigh adapted for use in Alaska

More Results of Tractor Tests at Nebraska

Of sixty-six tractors tested, eight have increased their rated engine speed, six lowered their horsepower rating, fourteen changed some item of equipment and three withdrawn. Most makes have met requirements, but extravagant advertising claims are a subject of just criticism.

THERE seems to be some difference of opinion among tractor manufacturers regarding the value of the official tests which a tractor must pass before it can be placed on sale in the State of Nebraska. Some very uncomplimentary things have been printed about the tests, and one maker especially has complained bitterly that the brake tests are made in a room where the air is vitiated by burnt gases and therefore not capable of burning the same amount of fuel, per cubic foot, as the pure air in the open fields.

On the other hand it will be observed that practically all of the well-known makers of tractors have entered their machines for the tests. Most of them have been fully able to meet the requirements and have suffered no other humiliation than having some of the braggadocio in their trade literature pointed out.

As far as the official tests are concerned, there can be no doubt that they serve a useful purpose, not only to the farmer but to the manufacturers as well. Many of the smaller manufacturers do not have the equipment necessary to accurately test their tractors for drawbar and belt horsepower, and the Nebraska Experiment Station affords them an opportunity to have these tests made at a nominal expense. In a way such firms are at a disadvantage in entering their machines for the tests, because they have to assume the risk of failure, whereas large firms fully equipped with testing outfits know in advance exactly what showing their machines can make.

Tests Producing Good Effect

We are informed that these tests have already had an important effect on commercial and engineering practice in the tractor industry. Thus, after sixty-six tractors had been submitted to tests, the makers of

1. Eight increased their rated engine speed.
2. Thirteen lowered their horsepower rating.
3. Fourteen changed some item of equipment and
4. Three withdrew.

This indicates that, as originally submitted, more than one-half of the tractors did not come up to their ratings. This can in some cases be explained on the assumption that the makers were not in possession of the apparatus necessary to test their machines themselves. No doubt as a result of their initial failure in the official tests many of the makers resolved to install such apparatus in their plants so that in future they can determine the capacity of their tractors for themselves.

From the farmer's standpoint the advantages of official tests are obvious. He has absolutely no means of checking the maker's claims as to horsepower, and without the official tests would have to accept these claims on good faith.

On the whole the tests should help the tractor industry, because it will increase the faith of the buying public in that industry. This is on the assumption that the tests are carefully and honestly made, and we give the tractor industry and its representatives credit for sufficient intelligence to enable them to discover any possible causes of error and to insist upon its elimination. On the other hand, the tests were instituted specially for the benefit of the farmer, and his end is undoubtedly well looked after.

Another feature of the official supervision of the tractor trade in Nebraska is the censorship or criticism of general statements or claims in trade literature. One may feel inclined to smile at this, as it has been the practice of advertising writers from time immemorial to make a liberal use of superlatives and not to worry about proof of their assertions. However, the abuse has probably been carried to extremes in agricultural advertising, on the assumption that the farmer would swallow it all, no matter how exaggerated the claims. The institution of censorship in Nebraska may be regarded as a rebellion of the farming population of that state against such treatment.

In the table herewith are given condensed results of tests on twenty more tractors, and we reprint also the comments on the advertising literature of the makers.

The following together with the data printed in AUTOMOTIVE INDUSTRIES for Sept. 2 completes the record of the tests thus far reported. Test data have been released for publication only by consent of the manufacturer concerned.

Test No. 15—Minneapolis 35-70. In the advertising literature submitted with the application for test of this tractor we find some statements and claims which cannot be directly compared with the results of this test. It is our opinion that none of these statements or claims are unreasonable or excessive.

Test No. 18—Fordson. Remarks same as for Test No. 15.

Test No. 22—Gray 18-36. In the advertising literature submitted with the application for test of this tractor we find some statements and claims which cannot be directly compared with the results of this test. It is our opinion that none of these statements or claims are unreasonable or excessive except the following: "To-day no tractor at any price excels it in quality of construction, simplicity of operation or durability. In all around usefulness and final economy it has proved its superiority."

"The Gray tractor requires no special equipment." (Referring to farm implements.)

"There is no give to any part of it." (The frame.)

"It is not possible to make better gears than are used in the Gray tractor."

"It (the drive chain construction) also gives a large bearing surface, so that all danger of wear or stretch is eliminated."

"This air cleaner by a dry process removes all the sand and dust from the air before it passes into the carbureter."

"The downward pull of implements . . . presses the wide drive drum on to the soil sufficiently to insure perfect traction.

Details of Tractor Tests Officially Conducted Under Nebraska State Law

No. of Test	Name and Model of Tractor	Belt Tests													Drawbar Tests					Oil* Gal-hr.
		Test at Rated b. hp. (2 hr.)			Varying Load Test				Maximum b. hp. Test (1 hr.)			Half Load Test			Rated Drawbar Load (10 hrs.)			Maximum Drawbar Load		
					maximum		minimum													
		hp.	r.p.m.	Hp-hr gal.	hp.	r.p.m.	hp.	r.p.m.	hp.	r.p.m.	Hp-hr gal.	hp.	r.p.m.	Hp-hr gal.	lb.	m.p.h.	Hp-hr gal.	lb.	m.p.h.	
15	Minneapolis 35-70	70.31	556	7.96	71.12	547.5	1.97	625	74.01	556	7.42	37.80	596	6.86	6910	2.10	5.32	10998	1.79	6.25-44
18	Fordson	18.16	993	7.32	18.70	1007	0.86	996.5	19.15	1014	6.38	9.32	1005	5.77	886	2.57	2.45	2187	1.60	3.75-34
22	Gray 18-36	30.46	958	5.83	30.67	948	1.94	1452	32.30	958	6.67	15.29	958	5.58	2703	2.73	4.48	3044	2.24	2.58-43
23	Titan 10-20	20.18	577	7.86	21.26	572.5	1.05	590	28.15	580	6.06	10.47	586	5.61	1827	2.04	3.31	2660	1.93	8 -30
29	LaCrosse G12-24	24.23	899	6.56	24.31	896.5	3.04	1225	24.94	902	5.72	13.11	970	5.89	1859	2.75	4.76	2155	3.10	3 -18
30	Aultman-Taylor 30-60	60.29	553	8.71	64.73	532	2.13	584.5	75.49	562	7.46	37.00	591	6.53	5184	2.54	4.97	9160	2.38	17.25-44
31	Aultman-Taylor 15-30	30.40	906	7.44	31.02	904	1.51	968	34.37	898	5.94	15.83	938	6.14	2497	2.36	3.91	2838	2.80	5 -35
32	Aultman-Taylor 22-45	44.92	600	8.38	45.53	602.5	2.44	720	46.66	607	7.49	26.97	713	6.51	3723	2.46	5.92	4986	2.11	16.75-36
35	Coleman B 16-30	30.27	914	5.34	30.80	907	2.31	1125	30.41	907	5.32	18.07	1070	5.43	1961	2.92	2.73	2690	2.16	6 -32
37	Parrett "K" 15-30	31.31	1015	9.04	31.76	1027	1.45	1108	31.79	1010	8.03	15.59	1006	6.40	2197	2.73	5.15	2988	2.63	5.25-54
39	Avery 6-cyl "C"	14.08	1252	6.03	14.69	1250	1.70	1435	14.62	1246	6.12	8.09	1398	6.35	1216	2.17	2.79	1862	1.74	4.50-44
40	Avery 6-cyl. culti.	15.54	1243	6.22	15.72	1262	1.69	1950	15.77	1240	6.22	9.20	1469	6.59	1213	2.63	3.34	1674	2.01	3.75-32
41	Avery 12-20	20.18	804	8.98	20.79	796	1.59	847	24.26	800	6.38	10.59	843	6.19	2238	2.34	4.25	2608	2.53	6.25-30
42	Avery 14-28	28.16	901	8.24	28.03	874.5	2.06	958.5	31.83	898	7.63	14.22	916	6.29	2646	2.50	4.94	3049	2.65	7.75-33
43	Avery 25-50	50.40	702	7.91	51.56	691	3.12	893	56.86	712	8.05	25.53	710	5.33	3778	2.71	4.25	4415	2.67	10.50-32
44	Avery 40-80	65.73	612	7.26	66.25	615.5	2.92	678.5	69.23	597	8.41	36.56	679	4.89	7812	2.25	3.96	8475	2.21	12 -39
45	Cletrac W 12-20	20.14	1276	8.33	21.30	1318	1.22	1359	24.94	1321	8.61	11.38	1406	5.96	1395	3.62	5.04	1734	3.36	5.75-30
46	Frick "C" 15-28	28.26	906	6.21	28.34	898	2.39	1199	29.72	917	5.71	14.61	935	7.15	2372	2.41	4.46[1]	3264	2.24	4.75-32
49	Wallis 15-25	25.19	918	7.74	25.51	928	1.23	1224	27.57	907	6.88	14.98	1073	6.70	2362	2.55	3.54	2782	2.50	4.25-32
50	Flour City 18-35	35.23	805	7.68	35.05	802	1.07	920	35.46	807	7.58	18.91	857	8.42	3784	1.81	4.00	4116	1.71	12.75-30

*In engine only. The reports give kind of oil and amount used in transmission.

The pressure is never great enough to pack the soil no matter how soft it may be."

The belt pulley speed is given as 900 r.p.m. This should be changed to 950 r.p.m. to conform to specifications certified.

Carbureter is described as being the Bennett. This should be changed to Stromberg to conform to specifications certified. The tractor equipped with Bennett carbureter was given a brake test and developed only about 26 b.hp.

Test No. 23—Titan 10-20. In the advertising literature submitted with the application for test of this tractor we find some statements and claims which cannot be directly compared with the results of this test. It is our opinion that none of these statements or claims are unreasonable or excessive except the following:

"Chains are the best known final drive for a farm tractor." (We do not approve this statement for the reason that proof is lacking.)

"It is the most practical cooling system known."

"The throttle governor . . . keeps the speed constant at all loads." (The governor gave exceptionally close regulation of speed in this test; but the speed varied some with load changes.)

"The facts are that the Titan 10-20 . . . will pull as many plows as any other tractor of equal rating . . . " (We do not approve this statement for the reason that authentic information is not available at the present time on the capacity of some of the tractors included in this comparison.)

Test No. 29—La Crosse Model G 12-24. In the advertising literature submitted with the application for test of this tractor we find some statements and claims which cannot be directly compared with the results of this test. It is our opinion that none of these statements or claims are unreasonable or excessive except the following:

"Perfect fuel combustion."

"La Crosse tractors hold the low fuel consumption record."

"Line drive unequalled either by other tractors or horses."

"Horizontal twin-cylinder motor has been thoroughly proved to be the most efficient design for burning kerosene."

"More economical in operation and upkeep than any other tractor."

We do not approve the above statements and comparisons because they cannot be directly compared with results of this test, and proof is lacking.

Test No. 30—Aultman-Taylor 30-60. In the advertising literature submitted with the application for test of this tractor we find some statements and claims which cannot be directly compared with the results of this test. It is our opinion that none of these statements or claims are unreasonable or excessive except the following:

"We guarantee this tractor to move more cubic feet of earth in a given length of time with less fuel and less maintenance cost, using the same tools, working under the same conditions . . . than any other make of tractor regardless of its size or rating."

" . . . it is still first in the large tractor field, because no other tractor can produce a similar record for faithful, economical performance over a period of ten or more years."

"In fact they (the 22-45 and 30-60) have established records for power and economy that have never even been closely approached by any other tractor."

"We can safely say that they are the best designed and best built tractor motors used on any heavy duty tractor."

(We do not approve the comparisons with other tractors quoted above for the reason that proof is lacking.)

Test No. 31—Aultman-Taylor 15-30. In the advertising literature submitted with the application for test of this tractor we find some statements and claims which cannot be directly compared with the results of this test. It is our opinion that none of these statements or claims are unreasonable or excessive except the following:

"And it gets every ounce of power out of the fuel that there is in it."

"In plowing, for example, this 15-30 does double the work of the two-tractor in the same time, with less than one-half the operating cost, and in doing the work it travels only one-half the distance so naturally last once again as long."

" . . . enables the 15-30 to work on plowed ground without packing the soil."

"This size develops 30 hp. at the belt with several horsepower reserve." (We do not approve this statement for the reason that it is indefinite and therefore likely to be misleading.)

Test No. 32—Aultman-Taylor 22-45. In the advertising literature submitted with the application for test of this tractor we find some statements and claims which cannot be directly compared with the results of this test. It is our opinion that none of these statements or claims are unreasonable or excessive except the following:

"In fact they (the 22-45 and 30-60) have established records for power and economy that have never even been closely approached by any other tractor."

"We can safely say that our tractors are free from any transmission trouble."

"We can safely say that they are the best designed and best built tractor motors built on any heavy duty tractor."

(We do not approve the comparisons with the other tractors quoted above for the reason that proof is lacking.)

Test No. 35—Coleman Model B 16-30. In the advertising literature submitted with the application for test of this tractor we find the following statement regarding horsepower capacity. "An excess of engine power." We do not approve this statement for the reason that it is indefinite and therefore likely to be misleading. We also find in this advertising literature some statements and claims which cannot be directly compared with the results of this test. It is our opinion that none of these statements or claims are unreasonable or excessive except the following:

"Motor—All bearings flooded with oil under pressure. No piping to clog."

"Carburetor—Bennett special tractor." (This should be changed to Stromberg to conform to specifications certified to us.)

"In transmitting engine motion into steady, useful *pulling* leverage against the ground through the rear axle and drive wheels no tractor excels the Coleman Worm Drive. The jack screw power principle as adapted for tractor use in the Coleman worm and worm gear makes possible a greater actual utilization of power than in any other tractor."

Test No. 37—Parrett Model "K" 15-30. Advertising literature submitted with the application and specifications for test of this tractor, contains some claims and statements which cannot be directly compared with the results of this test. It is our opinion that these are not excessive or unreasonable except the following:

"Direct drive on every speed, delivers all the power of a wonderful motor."

"Great reserve power."

"Great economy in either kerosene or gasoline."

"Direct drive on every speed, delivers all the power in plowing or belt work."

"Exceptional large radiator capacity and placing of same affords unusual cooling ability."

"The most powerful three plow tractor in the world."

We do not approve the above exceptions because proof is lacking and they are indefinite.

Test No. 39—Avery Six Cylinder Model "C." In the advertising literature submitted with the application for test of this tractor we find the following statement: "This machine is recommended to burn gasoline, but may burn kerosene with entire satisfaction . . . " This is not interpreted by us to be a claim that this is a kerosene tractor and therefore it was not operated on kerosene in this test. We find in this advertising literature some statements and claims which cannot be directly compared with the results of this test. It is our opinion that none of these statements or claims are unreasonable or excessive.

Test No. 40—Avery Six Cylinder Motor Cultivator. In the advertising literature submitted with the application for test of this tractor we find the following statement: "Fuel: Gasoline. Many customers report using kerosene, however, with satisfactory results." We do not interpret this statement as being a claim that this is a kerosene tractor and therefore kerosene was not used in this test.

In this advertising literature we find some statements and claims which cannot be directly compared with the results of this test.

It is our opinion that none of these statements or claims are unreasonable or excessive except the following:

"The Avery motor cultivator is the only real successful cultivator on the market to-day, and it leads the field in power, durability, simplicity, etc., over any other cultivator built."

"The Avery motor cultivator is adapted to more kinds of farm work than any other machine . . . "

We do not approve the comparisons with other tractors quoted above for the reason that proof is lacking.

Test No. 41—Avery 12-20. In the advertising literature submitted with the application for test of this tractor we find some statements and claims which cannot be directly compared with the results of this test. It is our opinion that none of these statements or claims are unreasonable or excessive except the following:

"Avery tractors have . . . motors . . . with . . . patented gasifiers that turn kerosene or distillate into gas and burn it all."

" . . . Avery . . . is the . . . most 'direct drive' transmission system built."

"Avery . . . is the . . . most efficient belt and drawbar transmission system built."

" . . . a larger percentage of the power developed by the motor in Avery tractor is delivered to the belt wheel and to the drawbar than in any other tractor built."

" . . . Avery opposed motors are superior to any tractor motor built."

"The opposed type of motor . . . is much better adapted for use in tractor work."

"The fuel system used on the Avery tractors from the 8-16 hp. to the 40-80 hp. size burns kerosene, distillate or any other low grade fuel more successfully than it has ever been done before."

" . . . Avery tractors are the simplest tractors built."

"Averys are the best all-around drawbar and belt tractors built."

We do not approve the comparisons with other tractors quoted above for the reason that proof is lacking.

Test No. 42—Avery 14-28. Remarks same as for Test. No. 41.

Test No. 43—Avery 25-50. Remarks same as for Test No. 41.

Test No. 44—Avery 40-80. Remarks same as for Test No. 41.

Test No. 45—Cletrac W 12-20. In the advertising literature submitted with the application for test of this tractor, we find some claims and statements which cannot be directly compared with the results of this test. It is our opinion that these are not excessive or unreasonable except the following:

"It is easy to line up and easy to keep lined up on belt work."

"20 horsepower at belt without strain in any part."

"It burns kerosene or distillate or gasoline perfectly, and uses less than two gallons of fuel per working hour."

"The Cletrac plows an acre an hour—10 acres a day—and does it on not more than two gallons of fuel per acre."

"For example in operating the larger types of ensilage cutters the Cletrac might use say 1½ gallons of kerosene an hour while on lighter work it would use less than a gallon."

Test No. 46—Frick "C" 15-28. In the advertising literature submitted with specifications and application for test of this tractor, we find some statements and claims which cannot be directly compared with the results of this test. It is our opinion that these are not excessive or unreasonable except the following:

"Right belt power for farm machines."

"No unnecessary side draft—a saving of fuel and power."

"Fuel operating cost as low as the lowest."

We do not approve of the above statements because proof is lacking.

Test No. 49—Wallis 15-25. All during this test, the motor while running on kerosene seemed to load up on fuel and slow down, miss fire once and then run smoothly again for a while. On gasoline it worked smoothly. In the advertising literature we find some claims and statements which cannot be directly compared with the results of this test. It is our opinion that these are not unreasonable or excessive except the following:

"Delivers 74 per cent of its motor power to drawbar."

"Wallis is unexcelled for hauling."

"Among the few good tractors the Wallis stands out head and shoulders above all the rest as 'America's Foremost Tractor'."

"It was and is years in advance of all others."

"Wallis develops wonderful power and burns any fuel."

We do not approve of the above statements, because proof is lacking.

Test No. 50—Flour City 18-35. In the advertising literature submitted with the application for test of this tractor, we find some statements and claims which cannot be directly compared with the results of this test. It is our opinion that none of these statements and claims are unreasonable or excessive except the following:

Page 11—"The gears are made from drop forgings of high carbon steel accurately machined and hardened, enclosed and running in oil, and they are unequaled for substantiality and long life."

Page 12—"There is an entire absence of vibration in Flour City tractors."

Substitute Metals in Automobile Construction

Notes from an official report made by the manager of a German vehicle park during the war show how the shortage of copper and aluminum was met by the use of iron and steel in various forms wherever possible.

By Benno R. Dierfeld

THE German Transport Corps during the war had plenty of opportunity for gathering information regarding substitutes for metals and other materials employed in automobile manufacture and some of the experiences then had may prove of value to automobile designers. The following translation of an official report by the manager of a large motor car park, should therefore interest readers of AUTOMOTIVE INDUSTRIES.

Substitutes for Aluminum.—Crankcases of cast iron are considerably heavier, but are just as durable as those of aluminum. More care is required, however, in making them oil tight. Crankcases of sheet steel are only slightly heavier than aluminum crankcases, and present no other disadvantages.

Fans with sheet steel blades, if well riveted, are in no way inferior to aluminum fans. Fans with sheet zinc blades are too heavy. The blades break owing to cold shortness and are apt to badly damage the radiator.

Inlet manifolds, water jacket cover plates and valve spring cover plates of malleable cast iron are inferior to aluminum only in that they are heavier.

Clutch cones of pressed steel are not heavier, and are more durable than aluminum cones, because the latter will easily break if not handled properly.

Transmission casings of cast steel are considerably heavier, but are stronger and more rigid than aluminum.

Headlamp reflectors of zinc are considerably heavier and more breakable than aluminum reflectors, and they are often broken by road shocks. Breakage very seldom occurs with aluminum reflectors.

Substitutes for Babbitt Metal.—The greater the component of zinc or lead, the shorter the life of the bearings.

Ball and roller bearings for the main and crankpin journals are very serviceable if of sufficient dimensions. The roller bearings mounted in the connecting rods are usually of too small size.

Substitutes for Copper.—Cooling water connections of malleable cast iron or seamless steel tubing did not show any disadvantages. Steel tubing is quite serviceable for the connections of the lubricating system. Fuel supply pipes of steel will break in two months if not firmly fastened to the frame, and if the fuel used contains water or alcohol, they rust easily. Steel tubing for conveying acetylene gas to the headlights will rust within a very short time. Steel-asbestos gaskets must be handled more carefully in dismantling than copper-asbetos gaskets, as they do not conform as readily to the shape of the flanges. Electric cables of steel wire are quite durable when carefully mounted.

Substitutes for Bronze, Brass, Etc.—Bearing shells for the main or crankpin bearings, made of cast iron, if well tinned, give sufficient adherence to the babbitt metal. Piston pin bearings of cast iron are quite serviceable; if made of steel there is a tendency to scoring, unless they are carefully hardened. Camshaft bearings of cast iron are easily hammered out in small engines. Timing gears of cast iron, if sufficiently liberally dimensioned, will last for a long time. Circulation pump housings of cast iron will rust only slightly as long as the car is in regular service. Universal joint bushings of steel, if well hardened, are the equal of bronze bushings. These steel bushings must have flanges with substantial fillets, otherwise cracks and ruptures will occur. The manufacture of such steel bushings requires considerably better equipment than the manufacture of bronze bushings. Universal joint sliding blocks of steel, if very carefully hardened, are quite reliable; ball bearings are not as serviceable as these blocks, as they cannot be sufficiently lubricated. Cast iron steering gear nuts and sectors wear rapidly.

Substitutes for Brass.—Radiators of tin plate rust through in a short time, becoming sieve-like and draining dry in about three weeks. Water drain cocks of iron easily rust and stick; compression cocks of iron (in the ordinary or standard form) will burn and stick and are easily wrenched off when great pressure is applied to open them. The newer construction in the form of conical valves can be easily opened, but unfortunately they often open of themselves. Compression cocks of brass with iron taps are useless, because on becoming heated the tap will stick in the brass; on the other hand, iron cocks with brass taps have proved very serviceable. Fuel valves made of iron are not serviceable, as they do not make a tight fit. Valve caps of cast iron do not burn or stick in the cylinder threads, and can be easily unscrewed.

Disk clutches composed of steel disks only serve very well if carefully lubricated. Often such clutches are superior to the kind in which bronze and steel disks alternate, being more durable. Ball bearing mountings of malleable cast iron in the transmission case did not show any disadvantages. Gear shifter rod guides of malleable cast iron with bushings of brass serve as well as all brass guides. Rear spring saddles can be made without bushings if lubrication is properly provided for. If bushings are used, they can be made of thin sheet brass. Acetylene generators of sheet iron rust through in a short time, so that repairs are not worth-while. Some good rust-preventing method, such as galvanizing of the whole generator, must be applied under all conditions.

Substitute for Leather.—Clutch lining of woven camel's hair is considered better than second grade leather lining. Linings of course easily scale off.

Substitute for Rubber.—Horn bulbs of sheet metal, if not used for a considerable period, are difficult to operate, owing to the formation of rust.

Two Types of Airships Used By French Government

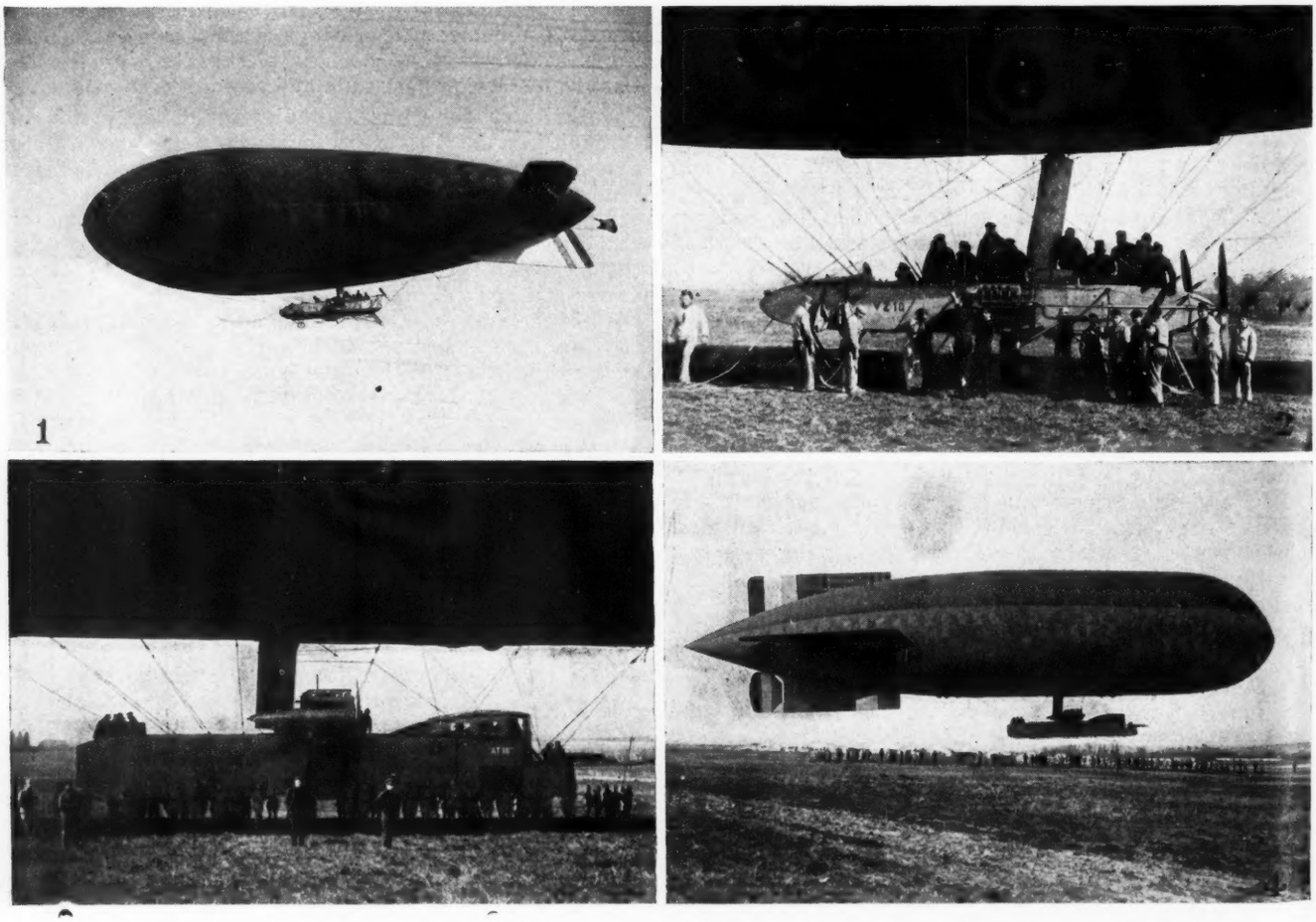
The latest dirigible has volume of 339,000 cu. ft. and uses two 250 hp. Renault engines mounted in streamline nacelles, and driving four-bladed tractor propellers of 10.2 ft. dia. Earlier machine has volume of 97,000 cu. ft. and uses two 80 hp. engines driving two-bladed pusher propellers.

By John Jay Ide

THE latest airship delivered to the French Government was built as part of a contract for six airships—AT-18 to AT-23 inclusive—of which the first two units have been completed, and the orders for the remainder cancelled. The AT-18 soon after delivery was destroyed by colliding with a mountain while en route to the South of France. Her sister ship, the AT-19, is now stationed at the aero station center at St. Cyr, and has just been accepted by the French Navy.

The envelope, of two-ply fabric, is of the familiar Astra-Torres trilobe pattern of rather poor streamline form. Its capacity is 339,000 cu. ft. The fin area is exceptionally great. There is only one rudder, of the balanced type, which forms a continuation of the lower vertical fin. The car, made up of wooden framing with steel wiring and covered with canvas, is rectangular in section with little or no attempt to reduce head resistance.

In the bow of the car is a platform for a 75 mm. gun, reached by a trapdoor in the floor of the navigating room,



(1) French naval airship VZ-10 from below. (2) Car of VZ-10, showing long transmission shaft between 80-hp. Renault engine and propeller. (3) Astro Torres AT-18. Side view of car, showing 75-mm. gun, navigating room and one of the 270-hp. Renault engines. (4) Astro Torres AT-18. Side view showing trilobe envelope, large fin area and single balanced rudder

which is just aft of and slightly above the gun platform. This navigating room is enclosed and lighted by a number of windows.

Aft of the navigating room on the starboard side of the lower level is the wireless telegraph room, with a S. F. R. 500-watt set weighing 176 lb., while on the port side is the corridor with a door giving access to the car.

Amidships is the engineer's station with the five gasoline tanks containing 488 gal. and a 6 hp. Charron blower engine for the two ballonets. A ladder ascends to the platform from which the two 250-hp. Renault engines mounted outboard in streamline nacelles can be reached. The radiators mounted in the nose of the nacelles have proved insufficient and additional small radiators have now been installed above the engines. The four-bladed tractor propellers are 10.2 ft. in diameter.

Aft of the engineer's station are the racks for the four 330-lb. bombs and in the stern of the car is a machine gun mount.

The specifications of the AT-19 are as follows:

Volume	339,000 cu. ft.
Volume of ballonets	141,000 cu. ft.
Length	262.4 ft.
Maximum width of envelope	54.1 ft.
Width over fins	59.0 ft.
Total height	71.2 ft.
Length of car	53.1 ft.
Width of car	5.6 ft.
Height of car	6.6 ft.
Area of horizontal fins	968 sq. ft.
Area of vertical fins	645 sq. ft.
Area of elevators	323 sq. ft.
Area of rudder	204 sq. ft.
Useful load:	
Crew (7 people)	1232 lbs.
Equipment	528 lbs.
Fuel and oil	2750 lbs.
Wireless equipment	176 lbs.
Armament	1760 lbs.
Ballast	2534 lbs.
Total	8980 lbs.

Speed (maximum), 50 miles per hour; cruising range, 10 hours; engines, two Renault, each developing 250 hp. at 1300 r.p.m.

Among the most popular airships used by the French Navy are the Vedette Zodiac types designed during the war, primarily for submarine scouting and built by the Zodiac Co. Although of very moderate size (97,000 cu. ft.), they can carry a considerable load and are fast for their power. They are also very maneuverable.

A typical example of the VZ class is the VZ-10, which was recently examined by the writer at St. Cyr, France. This ship is powered by two Renault air-cooled engines developing 80 hp. each at 1700 r.p.m. As shown in the photographs, these engines are placed outboard amidships and the drive to the two-bladed propellers at the stern is by means of long shafts inclined outward and equipped with universal joints. This method of drive has proved perfectly satisfactory with these engines. In one of the VZ airships, however, the Renaults were replaced by 150 hp. Hispano-Suiza aviation engines in an effort to improve the performance. With this installation spark plug trouble occurred after a few hours running causing vibration and breaking of the shafts.

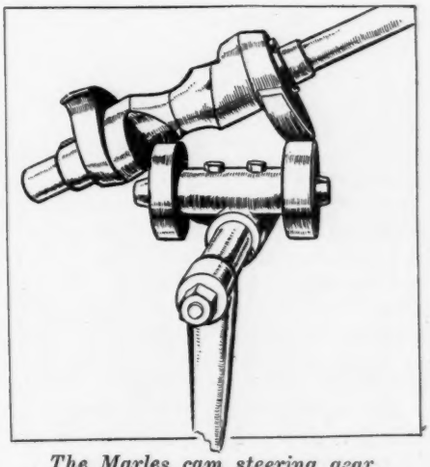
The car carries the altitude pilot in the nose with a rudder bar for emergency use. Aft of the altitude pilot's station are two seats side by side, the directional pilot using that on the port side. The engineer is amidships and in the stern are a Lewis machine gun and two bombs. A small 400-watt C. G. R. wireless set is carried.

At the stern of the envelope, which is of good streamline form, are two small horizontal fins and elevators and one vertical triangular fin with a balanced rudder. The specifications of the VZ-10 are as follows:

Volume	97,000 cu. ft.
Length	156 ft.
Diameter	35.6 ft.
Width over fins	40.4 ft.
Total height	56.1 ft.
Crew (4 people)	704 lbs.
Armament	220 lbs.
Ballast	605 lbs.
Speed	48 miles per hr.
Cruising range	6 hr.

A Steering Gear for Trucks

WE recently described the Marles steering gear, which comprises a double volute cam acting on a double armed lever carrying ball bearing rollers at the ends of its arms. The original design allowed for rather less than a single turn of the steering wheel to move the road wheels through their total range of deflection. This is not enough for heavy trucks, and Mr. Marles has therefore designed the gear shown herewith, which requires two complete revolutions of the steering wheel to move the road wheels from hard over one way to hard over the other way. This design also differs from the one previously described in that the angular deflection of the road wheels varies directly with the angular motion of the steering wheel.



The Marles cam steering gear. Two complete revolutions of steering wheel gives maximum angular motion to road wheels

F. FORREST, president of the Midland Branch of the Institute of Electrical Engineers, thinks that it is as nearly impossible to train men for research work as it is to train poets. It is necessary, he says, to first discover men with an aptitude for research work and then pay them.

Refinement, Style and Comfort Aim in New Body Designs

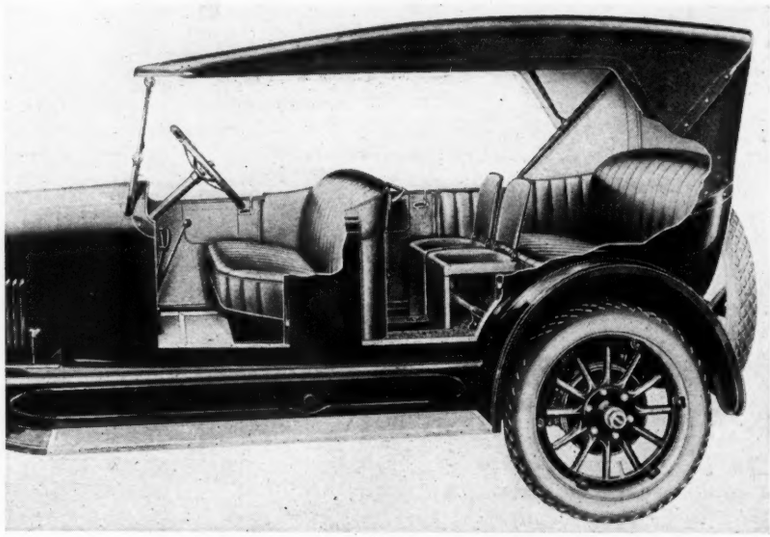
Straight lines characterize several of the prominent new models, while special effort to provide every comfort for the rider seems to have been made in most cases. One model shows extreme "cubist" lines, while the "Grecian edge" makes its appearance on another car.

By George J. Mercer

A STUDY of the new body designs indicates that manufacturers have endeavored to meet every demand that the buyer might make in regard to refinement, style and comfort. While the exteriors make the first appeal to the prospective owner, special attention has also been given to interior appearance and comfort, since interior values play a large part in influencing the selection of the more discriminating buyers.

The accompanying illustrations present the main features of the new designs being marketed and indicate in a general way some of the trend of body design. Since the main features of design are more or less familiar, attention can be directed chiefly to the more detailed phases of seating sizes, appointments, and trimmings.

The view of the new Buick seven-passenger touring model shows quite clearly the interior construction and equipment. The customary straight pleat is used on back and cushions, as well as on the sides of the rear section. On the sides of the front seats and the doors, however, the trim is plain. A robe rail and foot rest are provided, while the top presents exceptionally good lines. It is equipped with a detachable gypsy quarter curtain.



Interior view of Buick seven-passenger touring model

In the interior view of the four-passenger Liberty coupe the visor bracket and the comfortable seating arrangement are noticeable. Pleats are used on the cushions and on the seat backs as well. Trimming on the doors is plain. The door windows are equipped with regulators. A single dome light is placed in the center of the roof. This body is designed to seat four persons, the fourth seat being of the type which folds up. It is located at the right of the driver and faces forward. Another interior view of the Liberty coupe shows the large package compartment at the rear of the driving seat.

Some of the chief dimensions of this Liberty model are as follows: Tires, 33 x 4½; standard chassis; size of rear cushion, 20 in. deep, 36 in. wide, 9 in. thick; distance from top of cushion at front to floor, 13 in.; distance from top of cushion at front to roof, 37½ in.; size of door, 26½ in. wide over outside; rear window, 33 x 15 in.

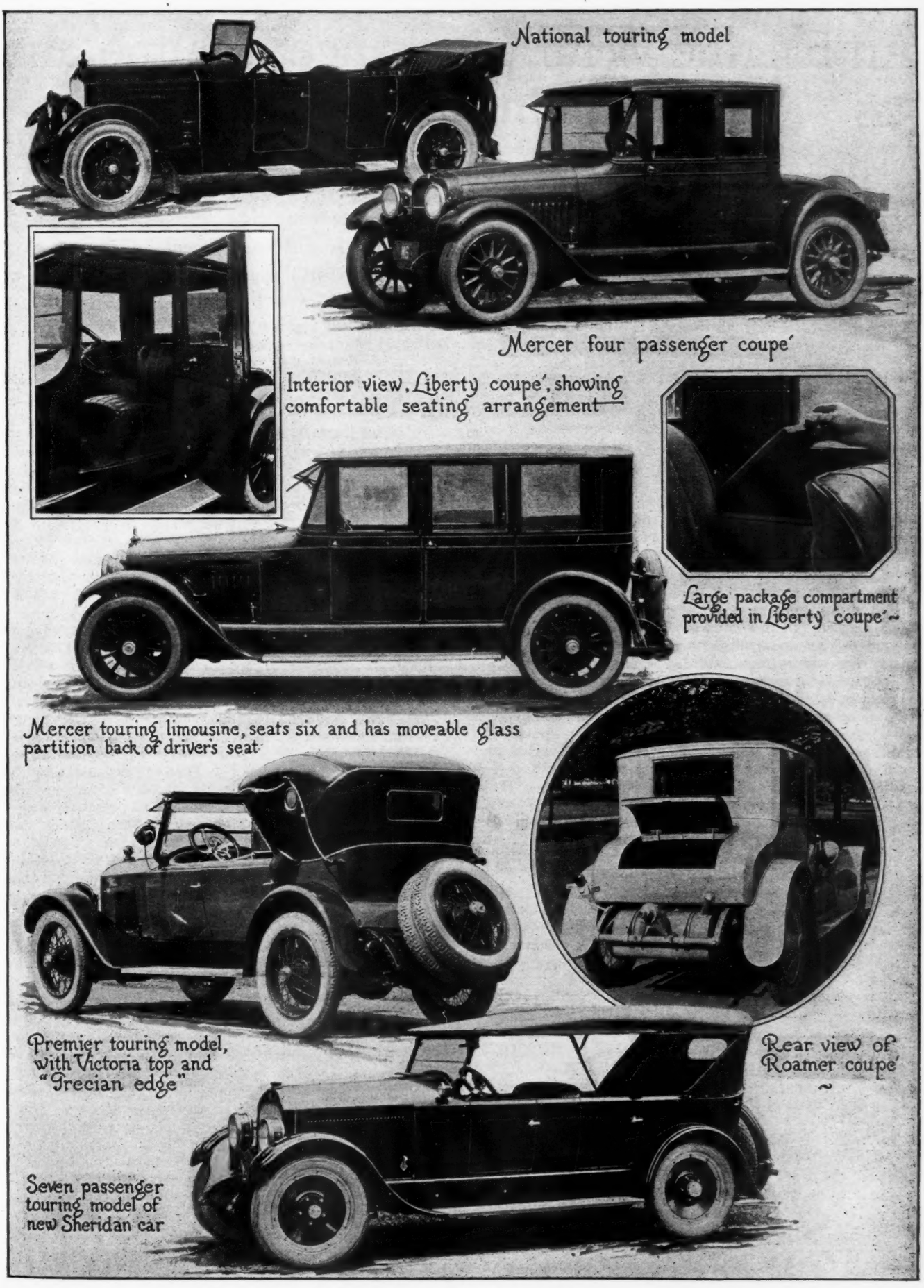
The two exterior views of the Mercer coupe and touring limousine are shown herewith. Both these models are low in appearance yet commodious. The coupe seats four and the touring limousine six persons. These bodies are constructed with aluminum panels and have leather roofs. The touring limousine has a glass partition at the rear of the driver's seat that allows the body to be readily divided into two compartments. A telephone is provided for communication in such cases. Among the important dimensions are the following: Wheelbase, 135 in.; rear seat cushions from floor to top, 13 in.; distance from top of rear seat cushions to roof, 36 in.; rear seat of touring limousine, 14 in. wide.

The cut of the Premier touring model shows a Victoria body with a molded top edge, called by the manufacturers the Grecian edge. It gives a more harmonious effect than does the bevel edge but permits the same low side appearance, and has the additional advantage of allowing the sides to be sufficiently high for comfort.

A rear view of the Roamer coupe is also reproduced. This model shows the bevel edge carried out on the roof and rear corner, and illustrates what is perhaps the most extreme cubist model being marketed.

The National touring model, illustrated herewith, shows a straight line through to the radiator. This is a semi-sport type without runningboards and presents a very low hung appearance.

The seven-passenger touring body of the new Sheridan car is also illustrated. This body has straight lines and a modified second cowl. It is equipped with disk wheels, a ventilator in the shroud, and dash lamps. The mud guards have molded edges.



National touring model

Mercer four passenger coupe'

Interior view, Liberty coupe', showing comfortable seating arrangement

Large package compartment provided in Liberty coupe'

Mercer touring limousine, seats six and has moveable glass partition back of driver's seat

Premier touring model, with Victoria top and "Grecian edge"

Rear view of Roamer coupe'

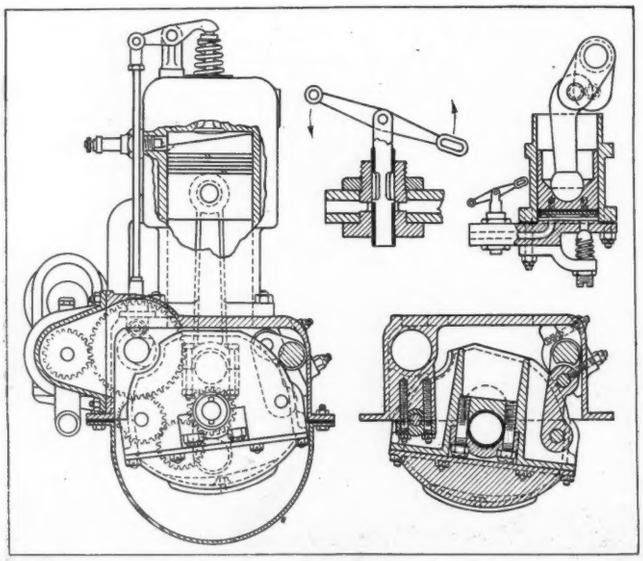
Seven passenger touring model of new Sheridan car

An Engine With Clearance Volume and Valve Timing Both Variable

Experimental engine has hydraulic device for raising and lowering crankshaft, thereby varying the compression. Tests indicate considerable saving in fuel under normal operating conditions, but some mechanical complications are involved as in other similar efforts toward same end.

ENGINEERS who have made a study of the theory and practical operation of the constant volume engine in general use on modern vehicles are well aware of the fact that, in common with other types of throttling engines, the economy is much less under throttled conditions (part load) than at full load. Since automobile engines operate under part load a large proportion of the time, many attempts to improve their inherent economy at part load have been made, but largely because of the mechanical complication involved, these attempts have not resulted in commercial application. In spite of this fact the rising price of fuel has encouraged further experimentation in the belief that the saving in fuel possible will justify increased first cost and, if necessary, somewhat increased cost of upkeep.

Charles A. Salisbury of Hudson, Iowa, has recently conducted experiments with an engine in which the throttle is maintained, but provision is made to vary the clearance volume in such manner as to maintain or increase compression pressures under part loads. As will be seen from the appended transverse sectional view of the engine, the crankshaft is carried in what would normally be the lower half of the crankcase, the latter being hinged at one side, and at the other connected to a linkage which enables the crankshaft and its carrying members to be raised and lowered, thus varying the compression space above the piston. The linkage for raising and lowering the crankshaft is controlled by an hydraulic piston operated by the flow of oil from the pump, driven from the crankshaft. The controls for this pump are interconnected with the throttle in such manner that the crankshaft is raised at part load when the throttle is nearest its closed position, and lowered when the throttle opens. At low loads the clearance volume can be decreased to one-fourth the maximum volume allowed under full load. When applied to a car, the variation in crankshaft position makes necessary a universal joint between engine and clutch.



Variable clearance engine

Means are provided for varying the timing of the inlet valves, the cams for the latter sliding lengthwise on the camshaft. The cams are so graduated on the closing face as to vary the closing point of the valves. The latter are held open during the entire suction stroke as in an ordinary engine, but are closed at varying points during the compression stroke to so limit the charge as to give the desired compression pressure. This method of control has the advantage that the compression is automatically increased with increased engine speed.

The inventor states that tests of the experimental engine have demonstrated the following points: 1. That the crankshaft, supported in the manner indicated, is as rigidly secured as in an ordinary engine. 2. That the secondary, unbalanced forces do not affect the engine differently at any speed than the regular type. 3. That the system of induction developed when using partial charges does not affect operation of engine when using regular manifold and reasonably dry gas. 4. That the expansion can be carried practically to atmospheric pressure up to one-third load. 5. That much higher compression pressure can be carried with advantage at high engine speeds than at low speeds, without pre-ignition or affecting smoothness of operation. 6. That the engine is as sensitive to control and as responsive to same as the regular engine, and that operation is as easy as with the ordinary type of engine. 7. That the average gain in mileage amounted to 40 per cent.

One disadvantage of the design is the fact that the area of the combustion chamber wall is not materially altered with decrease in volume of the clearance space.

The compression pressures used are said to have varied from 83 lb. at cranking speed to 120 lb. at 2400 r.p.m. with one-fourth normal volume of compression space, while with approximately full volume they varied from 90 lb. at cranking speed to 58 lb. at 2000 r.p.m., this variation being due in part to the change in valve timing. Under normal conditions of operation on the road, it was found possible to maintain a setting such as to give a clearance volume of one-fourth that used in the normal engine, but this did not hold true under conditions of rapid acceleration, heavy going, or climbing of steep grades.

The inventor of the engine points out the advantage of varying the timing of the inlet valves with the speed of the engine. He states that at lower engine speed there is a direct volumetrical loss of 11 per cent in an engine with valves closing 45 deg. late, as compared to 10 deg. late

in the experimental engine in question. It was found that the largest charge retained at high speed in the experimental engine was with the inlet valve closing at about 85 deg. late. It is thus argued that the size of an engine for given power can be made much less, if provision for changing the valve timing is made.

The experimental engine is said to weigh about 15 per cent more than the regular engine, but this difference in weight can be cut to 10 per cent by improvements in design.

The designer of the engine in question states that at engine speeds equivalent to a road speed of 25 m.p.h., the efficiency of the engine will remain constant regardless of load, while in the case of the ordinary engine the thermal efficiency decreases rapidly with decrease in load. In tests of a car equipped with the experimental engine, the gain in fuel economy is said to have been 21 per cent at 8 m.p.h. At 22 m.p.h. the increase is 36 per cent. These tests, it is said, were very carefully made with the same carbureter and setting, and the same position of ignition and control.

In one series of tests it was found that the fuel consumption steadily decreased with decrease in size of the clearance space down to one-fourth normal.

Direct-Reading Foot-Candle Meter

A DIRECT-READING foot-candle meter has been developed for readily determining the intensity of illumination at any particular point in a store, shop, living-room, etc. It is made in portable form and can be set on a bench, counter, etc. The principle of the device is as follows: If a white cardboard containing a small hole over which has been placed a piece of white tissue paper is held between the eye and a source of light, the tissue paper spot will appear brighter than the white cardboard. On the other hand, if the spot is viewed with the eye on the same side as the source of light, it will appear darker than the white cardboard. This, of course, is due to the fact that the white tissue paper is translucent and reflects only a small portion of the light falling upon it, whereas the white cardboard reflects a large proportion. If the illumination on both sides of the cardboard is the same, the tissue paper spot and the white cardboard appear to be of the same brightness.

A portable foot-candle meter

The above principle is applied to the foot-candle meter in the following way: Instead of cardboard and tissue paper, the screen consists of a piece of clear glass on which are two thicknesses of paper, the one which contains the round holes being fairly opaque, and the other highly translucent. This screen forms one side of the light box which is so constructed that the screen is illuminated from within (by an electric bulb mounted at one end) to a much higher intensity at the right than at the left. The exposed side of the screen is very nearly uniformly lighted, and the round spots appear brighter than the surrounding screen at the right end and darker at the left. It is evident that at the point where the spots change from brighter than their background to darker, the illumination on both sides of the screen is, as with the cardboard illustration, approximately the same. When the instrument has once been calibrated, the illumination intensity on the screen may be read at a glance.

It is obviously important that after the foot-candle meter has been calibrated, the light supplied to the screen from within must be constant for all readings or the indications will be in error. A rheostat, or adjustable resistance, is connected in series with the lamp and the battery. This permits the voltage applied to the lamp to be maintained at a constant value as the battery gradually depreciates. The voltmeter indicates the voltage applied to the lamp.

The best luminous intensity in industrial plants varies with the character of the work done. In rough box manufacture an intensity of 4 foot candles has been found sufficient, whereas where very accurate cabinet work has to be done, 7-8 foot candles is desirable.

ACCORDING to the Department of Statistics of India, 1041 motor cars were imported into British India during September, 1920, and of them no fewer than 723 cars were consigned from the United States, only 247 being received from the United Kingdom.

Preserving Polish of Metals During Annealing

IN a process, recently invented in Germany, for protecting polished metals which have to undergo annealing, from the tarnishing which occurs under ordinary treatment, a solution of boric oxide is used. The solution is only applied as a very thin film over the articles to be annealed, but it is claimed that it completely excludes atmospheric oxygen. The film melts at a temperature varying between 550 and 650 deg. Cent., according to its composition, and acts as a protection so long as it remains solid. Steel, for example, remains bright when heated to the melting point of the composition, and no discoloration takes place when the steel is tempered. It is stated to be still more effective in the molten or semi-molten condition, as it then forms a perfectly gas-tight cover round the article, even when heated to the highest temperature used in practice. The coating is perfectly fireproof, does not evaporate, and dissolves any oxidized matter on the surface of the heated metal. The coating can be applied either as a powder, sprinkled or dusted over the surface of the objects to be annealed, or as a liquid. It is soluble in water and methylated spirit, and the work to be annealed is simply dipped in the solution and allowed to dry. The coating peels off on cooling, or can be dissolved in warm water.

Machine for Milling Off Crankshaft and Camshaft Ends

Has capacity of 250 pieces per hour. Work is carried in pockets on revolving drum. One head is stationary and the other adjustable to accommodate work of varying length. Skilled operator not required.

IN machining shafts and similar parts which have to be turned on centers, the first operation usually consists in facing off both ends, and in many cases the shaft has to be brought to exact length at the same time. A machine for doing this work on the continuous operation principle is being manufactured by the Newton Machine Tool Co. and is illustrated in Fig. 1. In Fig. 2 are shown shafts 1⅜ in. in diameter which are being faced to length, with a production of 250 pieces per hour. For this operation the intermittent feed and rapid traverse mechanism is used. That is to say, when the pocket containing the pieces has revolved past the milling cutters, the feed automatically trips and engages the rapid traverse, which advances the work holding drums at a ratio of 10 to 1, and just before the next pocket containing the shafts is reached, the rapid traverse is tripped, reengaging the feed motion.

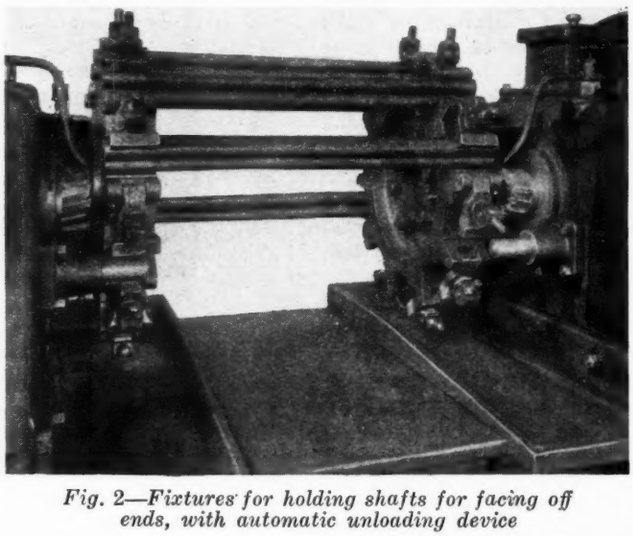


Fig. 2—Fixtures for holding shafts for facing off ends, with automatic unloading device

The loading of the drums is performed on what is the rear side of the machine in photograph. Unclamping and unloading of the drum for this operation are performed automatically. It will be observed that clamping is by a toggle lever which, as the drum rotates, is released by coming in contact with the two studs which are bolted to the housing. This allows the shafts to roll on the pans which, it will be observed, have an inclined surface, from which they are discharged into a tote box, or in some cases onto a roller conveyor. In this particular application there are ten stations or pockets on the drum, each holding three of the shafts in question.

Fig. 3 shows the machine as set up for machining both ends of a six-throw crankshaft. The jig locates the crankshaft by the plungers in the center, and they are placed alternately, which brings them so close together that the jump mechanism as described above is not required on the operation. The production on these crankshafts is 90 per hour.

Fig. 4 shows the method of machining both ends of camshafts. In this jig the camshaft is located by a universal chuck in the center, working from the center bearing. Again these pieces are placed so close together that the jump feed is not employed.

All of these operations are performed on the machine shown in Fig. 1. One head is mounted stationary at the

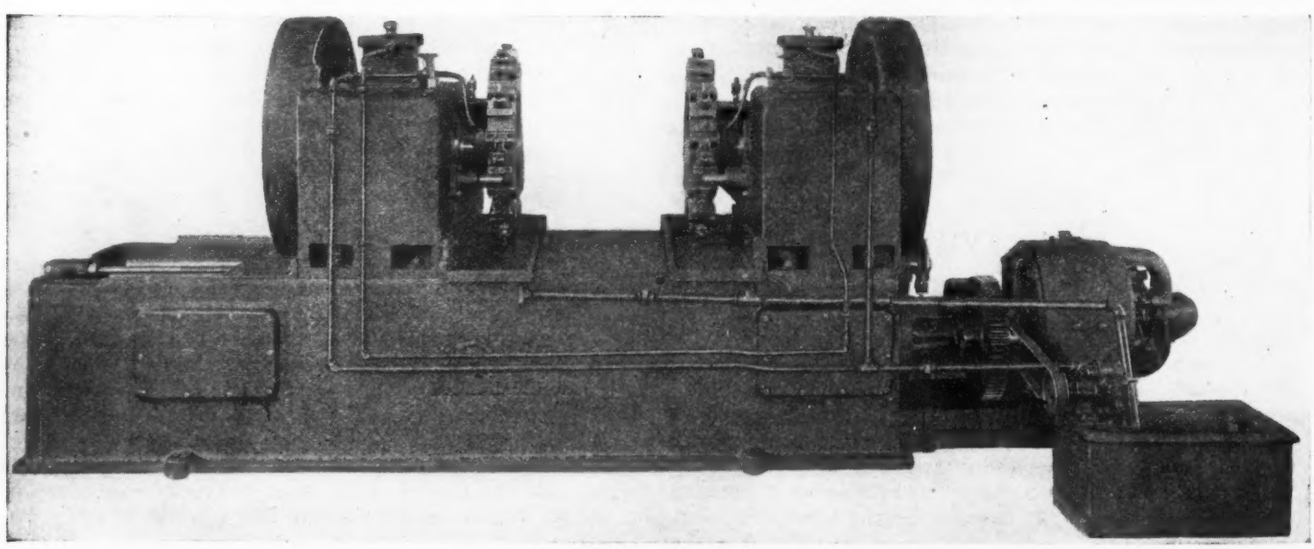


Fig. 1—Newton continuous milling machine for facing ends of shafts, etc.

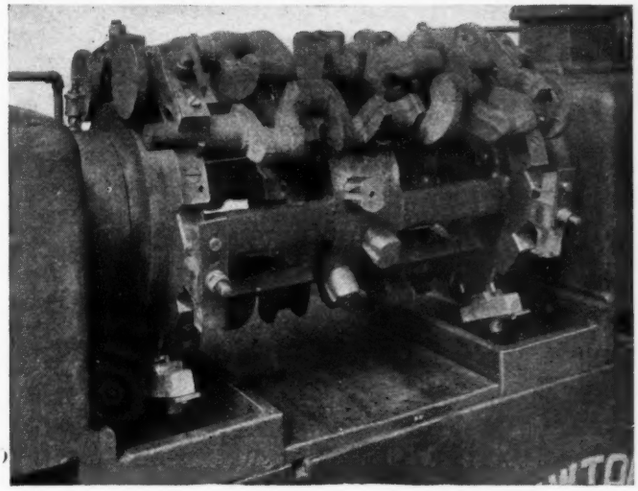


Fig. 3—Fixture for holding crankshaft

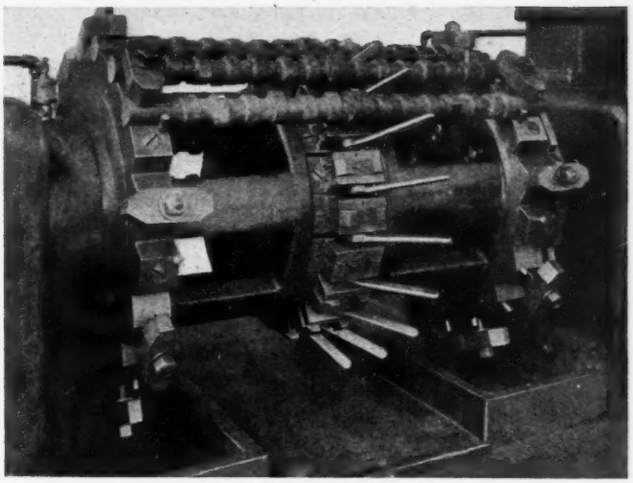


Fig. 4—Fixtures for camshaft

end of the base, while the other head is adjustable so as to take care of work of varying lengths. Each cutter spindle is individually adjustable for depth of cut; roughing and finishing cuts are taken for accurate work.

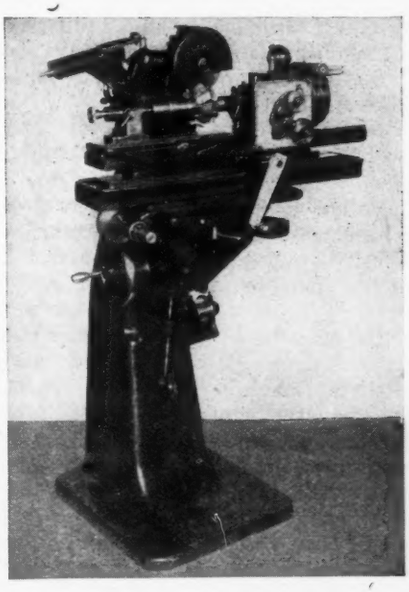
All bearings are oiled by a cascade system of lubrication. The machine does not require a skilled operator, as any workman can be quickly taught the simple operation of inserting and removing the pieces from the jig. The cutter spindles are driven by worms and worm wheels. The drum spindles are revolved by gears, both of which are driven from a common pinion shaft so that there is no possibility of their being out of register.

A Spiral Tooth Milling Cutter

THE advantages of "spirally" cut teeth have long been recognized by users of plain milling cutters. As contrasted to the chopping action of the straight tooth cutter, which strikes the work a distinct blow with each successive tooth, the progressive shearing cut of the cutter with "spiral" teeth insures a smooth, even surface and results in a decided increase in output due to the greater feeds and higher speeds that can be used. For this reason, in plain milling, cutters with "spiral" teeth are selected whenever high production and smooth cutting are looked for.

Mechanical difficulties connected with the manufacture and resharpening have heretofore prevented the use of "spiral" tooth form milling cutters. Pratt & Whitney now claim to have overcome these difficulties in their Curvex cutters. These are strictly production tools, combining the advantages of the older types of formed cutters with the smoothness of cutting, more rapid feed and greater speed, characteristic of "spiral" teeth.

We illustrate herewith a cutter grinder specially designed for grinding Curvex cutters. The machine is equipped with a conical grinding wheel which presents a single line of contact to the work. The wheel, therefore, is able to accurately follow the helical path of the tooth and to grind the cutting edge to the form required.



Grinder designed for grinding Curvex cutters

The machine is designed to impart a combined traverse and rotary movement to the cutter. The table on which the cutter is mounted can be swiveled horizontally about an axis which intersects the axis of the spindle and grinding wheel. When grinding Curvex cutters, this table is swiveled at an angle to correspond to the helix angle of the cutter teeth. It is then reciprocated in the usual way by means of a handle operating a rack and pinion. At the same time an oscillating movement is imparted to cutter through a set of change gears selected to conform to the lead of the cutter.

IN a paper recently presented to the American Iron and Steel Institute, the author, D. M. Buck, metallurgical engineer, American Sheet and Tinplate Company, states that there is an overwhelming mass of evidence to prove that by allowing with normal open-hearth or Bessemer steel a small copper content—0.15 to 0.25 per cent—the corrosion produced by air and moisture is greatly reduced. The melting point of copper is about 700 deg. Fahr. lower than the average tapping temperature, it diffuses readily, and once diffused does not segregate. The manufacture of copper steel has heretofore been largely confined to sheet metal, and the product has been greatly improved. A conservative estimate indicates that the life of sheet metal is at least doubled by this treatment. The author advocates the use of copper in all iron and steel products called upon to resist the attack of air and moisture.

THE Federal Trade Commission recently announced that forty-five export associations are operating under the Webb-Pomerene Law. These are combinations of firms for selling purposes.

The Amortization of War Plant Equipment

Here is one feature of the business income tax law that appears to have been overlooked in many instances by manufacturers who have not been able to write off all of their war losses. It is not generally known that the opportunity remains open for adjustment of plant valuation.

By Arnold F. VanPelt*

HOW many industrial executives have given serious thought to the provisions of the Amortization Clause, Section 214(a)9, of the Revenue Act of 1918? And how many of those who have given the matter consideration honestly understand the rights and privileges which this unusual provision of the Law confers upon them? It is a fact that the deductions permitted under the Amortization Section of the Revenue Act greatly exceed in value the deductions permitted under any other clause of the Law.

Congress undoubtedly made this provision so as to provide adequate relief from impossible taxation to the army of manufacturers whose wartime expansion was dictated by a sense of patriotism rather than by the hope of long continued business prosperity. During 1917 and 1918 the principal aim of American industry was to win the war in the shortest time possible. Regular production was largely discontinued, new plants were erected, old plants were converted and special machinery was purchased at fabulous prices. Automobile plants were transformed overnight into shell factories, shipyards appeared as if by magic, machine shops and foundries undertook production along new and untried lines, food manufactories enlarged their facilities to meet the ever-increasing demands of the war—the whole fabric of American industry, suddenly called upon to meet the urgent needs of the war machine, responded patriotically, met the demand placed upon it, and was a major factor in bringing the war to such a speedy and fortunate conclusion.

Sudden Change

Armistice Day found our great industrial machine working uphill at top speed. Thirty days later contracts had been cancelled and new and efficient plants were standing idle, their utility value suddenly nullified by the suspension of hostilities. Some of these plants are still idle—others have resumed operations on a reduced basis—many have been converted into peacetime industrial units—but in all cases their original economic value has been much decreased. It is true that a considerable part of the shrinkage in plant values has been liquidated by the Federal Government through its various War Claims Bureaus. The amount of damages paid to business organizations, under contract cancellation agreements, by the War and Navy Departments and by the Shipping Board, while of material assistance to industry throughout the country, does not end the story. From the standpoint of the manufacturer, consideration must be given to the Tax Law. In this connection it is well to call attention to the fact that Regulation 45, promulgated by the Commissioner of Internal Revenue, clearly specifies that "any allowance made to a taxpayer by a contracting Department of the Government or by any other contractor, for amortization or fall in the value of property, * * * shall be included in gross income."

If Congress had made no provision in the Tax Law for writing off, as a deduction from gross income, the shrinkage in value of wartime industrial plants, many war industries would have been forced to repay to the Government, in the form of Income and Profits Taxes, from 30 per cent to 80 per cent of the amounts received as compensation under contract cancellation agreements with the various contracting Departments of the Government. Congress, however, realizing the unusual industrial and financial conditions brought about by the war, provided Section 214(a)9, as a relief clause in the Revenue Act of 1918.

Technical Features of the Clause

It is the purpose of this article to call attention to this section of the Revenue Act and to present, insofar as is possible in a general survey of this kind, an exposition of the technical features of the clause. In the minds of the manufacturers of the country the matter is still shrouded in mystery. Heretofore writers on Federal taxation have generally avoided the subject, probably because the matter was new and untried and the technical phases of the question little understood. And yet there is no other relief provision of the tax law of more vital interest to industry, nor involving so many millions of dollars.

Before proceeding with the discussion of the application of Section 214(a)9 to the tax problem of wartime industry it is well to outline the distinction which the Internal Revenue Bureau makes between the terms "Depreciation" and "Amortization." Section 214(a)8 allows, as "Depreciation" a reasonable deduction from gross income to cover shrinkage in value of plant facilities resulting from wear and tear or from obsolescence due to the normal progress of business. The Bureau of Internal Revenue apparently applies the Depreciation Section literally. Unless an asset of the taxpayer loses a portion of its useful life from actual wear and tear or from obsolescence due to the normal progress of business, no deduction can be claimed under the heading "Depreciation." While it is rather common practice to refer to wartime industrial facilities

*Mr. VanPelt, who prepared this article for *Industrial Management* was formerly Chief of the Amortization Section of the Income Tax Unit. He is now associated with the Engineering Service Corp.

as becoming "obsolete" the Regulations of the Commissioner of Internal Revenue draw a line of distinction between those facilities which have become wholly or partly valueless through invention or change in style, and those wartime facilities which have lost their utility or economic value through the sudden cancellation of war business. Therefore, all extraordinary deductions resulting from the loss of economic or utility value in wartime facilities must be made under the relief section, that is, Section 214(a)9, Amortization.

The amortization deduction applies to a somewhat more limited field than does the depreciation and obsolescence deduction, but in industrial cases the amounts involved are much greater under the Amortization Section than under the Depreciation and Obsolescence Section. A separate deduction for depreciation or obsolescence cannot be claimed against facilities which are to be amortized. In this connection it is well to bear in mind that, although depreciation and obsolescence cannot be claimed against facilities which are to be amortized, nevertheless, in determining the proper allowance for amortization both depreciation and obsolescence may be included as factors.

Study of the Law

A careful perusal of Section 214(a)9 will disclose the fact that the law is broad enough to enable every business organization, whose wartime plant, by reason of the cessation of hostilities has lost all or a part of its utility or economic value, to file a claim for, and to be permitted to deduct from gross income, a reasonable amount for amortization or shrinkage in value of such facilities.

The Amortization Section provides that in computing net income there shall be allowed as a deduction from gross income a reasonable amount for the amortization of buildings, machinery, equipment, vessels, or other facilities, constructed, erected, installed or acquired on or after April 6, 1917, provided such facilities were for use in the production of articles or in the transportation of men or articles contributing to the prosecution of the war.

These provisions are generous in their scope. There are but three clauses in the section which limit the facilities which may be amortized:

1. The facilities to be amortized must have been constructed, erected, installed or acquired on or after April 6, 1917.
2. They must have been used in the production of articles or in the transportation of articles or men contributing to the prosecution of the war.
3. The deduction claimed must be reasonable.

April 6, 1917, is the date the Federal Government declared war and the insertion of this date in the Amortization Clause makes it clear that Congress did not wish to extend the privileges of amortization to those manufacturers, who prior to April 6, 1917, had taken the speculative risks involved in the erection of plants for the production of war materials for foreign governments. Most of the business men who "went into war work" after April 6, 1917, did so largely through patriotism, although it cannot be denied that in many cases the possibility of profit was a strong factor. On the other hand, those manufacturers who engaged in the production of munitions for foreign governments before our entry into the war did so from a purely commercial standpoint and are certainly not entitled to the same relief as are those manufacturers who, on or after April 6, 1917, constructed new plants and converted old plants in order to assist in meeting the unusual demands placed upon the United States and its Allies by the war.

The Income Tax Unit at Washington has apparently been liberal in its interpretation of the clause restricting amortization to those facilities used in the production of articles, or in the transportation of articles or men, contributing to the prosecution of the war. In view of the fact that the production and transportation of non-essentials were prohibited during the critical period from April 6, 1917, to November 11, 1918, it would seem that this restrictive clause has no practical effect and that any facility constructed, erected, installed or acquired during this period is capable of being amortized under Section 214(a)9, provided, of course, a real loss in economic value has been sustained.

Articles 184 and 185 of Regulations 45, Final Edition, contain the meat of the departmental regulations covering amortization. Article 184 prescribes the basis upon which amortization claims should be filed and Article 185 enters into a discussion of methods of spreading the amortization deduction over the taxable years of 1918 and 1919. Studying each of these articles at this late day, twenty-two months after the close of the war, it is at once apparent that the methods provided therein are inadequate and in some ways impossible of execution. This is not intended as a criticism. It must be remembered that Regulations 45, containing Articles 184 and 185, was published in the early months of 1919, and at that time it was the general belief that normal post-war conditions were to be looked for in a few months after the close of the war. Business prosperity and the era of high prices, the peak of which we have probably just passed, were not then anticipated. The amortization deduction is influenced entirely by economic conditions and in the early months of 1919 economic conditions for the balance of the year could not well be foretold.

One Amendment

In only one essential particular have Articles 184 and 185 been amended since the publication of Regulations 45, Final Edition. This amendment (Treasury Decision 2859) materially altered Article 184 and had an indirect and disconcerting effect on the method of spreading the amortization as outlined in Sub-division "C" of Article 185. Treasury Decision No. 2859 will be fully discussed elsewhere in this writing.

Article 184 classifies all facilities subject to amortization into three groups:

1. Facilities permanently discarded at the date of the return (that is, March 15, 1919).
2. Facilities to be permanently discarded prior to the last installment payment of the tax covered by the 1918 return (that is, December 15, 1919).
3. All other facilities (facilities having a certain useful life after the cessation of wartime production).

With regard to facilities falling in classes No. 1 and No. 2 above, the amount of amortization allowable is the difference between the undepreciated or unextinguished cost of the facilities and the scrap value thereof at the time such facilities are discarded. All wartime facilities which the taxpayer retained to use in his post-war business operations fall within Class No. 3. With regard to this latter class of property, the allowable amortization as originally provided for in Sub-division No. 3 of Article 184 was the difference between the undepreciated or unextinguished cost of such facilities and the "reproduction cost" thereof as at April, 1919. Obviously this portion of Article 184 had a tendency to limit the more liberal wording of the Law. April, 1919, was an arbitrary date fixed by the Bureau of Internal Revenue with the apparent belief that economic conditions would again be normal at that time. The fallacy of this belief is too

well known to merit discussion. The use of the phrase "reproduction cost" in establishing a basis for the determination of the amount of amortization on facilities falling within Class No. 3 was certainly anything but fair to taxpayers. With reproduction cost as at April, 1919, as the basis of value no deduction whatever could be claimed by the owner of Class No. 3 facilities to compensate for the extraordinary cost of construction of plant and installation of equipment during the war period for the reason that reproduction cost of plant facilities was, if anything higher during April, 1919, than during the actual war months.

On June 10, 1919, in recognition of the unfairness of Sub-division No. 3 of Article 184 the Treasury Department issued Treasury Decision No. 2859 reading as follows:

> "Paragraph No. 3 of Article 184, Regulations 45, Final Edition, is amended to read as follows:
>
> "In the case of other property the basis for the amortization calculation shall be estimated value of the property to the taxpayer in terms of its actual use of employment in his going business, such value in no case to be less than the sale or salvage value of the property, provided, however, that in no case shall the preliminary estimate (for purposes of returns to be made in 1919) of the amount of such amortization exceed 25 per cent of the cost of the property. In the final determination the amount of the amortization allowance will be ascertained upon the basis of stable post-war conditions under regulations to be promulgated when these conditions become apparent."

"Actual Use"

This amendment substituted a basis of "actual use or employment in his (the taxpayer's) going business" for "reproduction cost as at April, 1919." Undoubtedly this new basis is more in conformity with the spirit of the law than was the old basis of "reproduction cost" and yet under a narrow interpretation of the wording used a large number of taxpayers might be denied adequate relief. "Actual use" in the taxpayer's going business has been interpreted to mean the extent to which such facilities are utilized in actual operations. Under this construction a large body of manufacturers would be unable to obtain any relief whatever, unless the facilities involved were discarded. A still larger body of taxpayers would be denied a part of the relief to which they are entitled.

In order to clearly focus the unfortunate conditions which might arise out of a narrow interpretation of the wording "actual use or employment in his going business," let us take for example a manufacturer who, at the outbreak of the war, constructed a new plant for the production of high grade motors of a special type to meet the requirements of the Army. Under the spur of the War Department the plant was erected in the shortest time possible, overtime labor being used to a considerable extent. To expedite building operations much of the material was brought in by express. Skilled labor, taking advantage of the unprecedented demand for its services, insisted upon hitherto unheard of wages. Machinery and equipment were built under abnormal conditions and at outlandish prices. Motors for the Army had to be produced regardless of cost. The plant finally starts producing and works at top speed for a short period. The armistice is signed, orders are cancelled, and the plant is shut down.

The War Department pays to the manufacturer a lump sum to compensate for the loss sustained and in recognition of the excessive cost of construction of buildings and installation of equipment. The manufacturer who has a modern, well-equipped plant standing idle, finds that his plant, with slight alteration, can be used for the production of automobiles and that the demand for automobiles is sufficiently large to enable him to utilize his plant to capacity. An investigation of the cost of production, however, demonstrates to him that he cannot carry his plant at its cost value (less normal depreciation from wear and tear) and at the same time earn a profit on the production and sale of automobiles. He finds that his capital investment is out of line with the capital investments of other automobile manufacturers whose plants were constructed under better conditions.

Taxed on Allowance

He then reasons that he can apply the lump sum payment received from the War Department against his plant values, thus reducing his capital investment to a normal basis. He is advised, however, that he must report the payment received from the War Department as income under the Revenue Act of 1918 and pay to the Treasury Department as Income and Profits Tax thereon a large portion of each dollar received from the War Department as the result of the cancellation of war contracts. Acting under proper counsel, he seeks relief under the terms of the Amortization Clause of the Revenue Act of 1918, Section 214(a)9. A claim for amortization under Treasury Decision No. 2859 is prepared and filed with his tax return. In his claim he states that his plant can be operated to full capacity in the production of automobiles, provided a reasonable allowance is made for amortization to compensate for the loss in economic value of his plant and facilities.

Under a narrow interpretation of the words "actual use or employment in his going business" the Income Tax Unit might ignore the fact that the inflated plant values arising out of wartime construction rendered competitive production impossible, and would decide that, inasmuch as the facilities involved are to be used to capacity under the proposed production plan of the manufacturer, no allowance for amortization may be made. Under such a ruling the manufacturer would be forced to abandon his automobile project and to discard his plant. Upon taking such action he would file a new claim for amortization in a sum equal to the difference between the undepreciated cost of his plant and the scrap value thereof. If the facilities were actually discarded the revised claim would be allowed by the Bureau of Internal Revenue subject only to adjustments arising out of the determination of scrap value. Who would be the loser? The taxpayer would reduce his Federal taxes, but would lose the profits which would have accrued to him from the production and sale of automobiles. The Federal Government would lose a large amount of revenue, for it is reasonable to assume that the amount amortization allowed upon the abandonment of the plant would greatly exceed the amount which would have satisfied the taxpayer had he been allowed his original claim under Treasury Decision No. 2859. And in addition to its current loss of revenue the Government would, in effect, have destroyed a legitimate industry and throttled a future possibly large source of revenue.

Such would be the unfortunate condition brought about by a narrow interpretation of the wording of Treasury Decision No. 2859. All parties interested, the taxpayer, the Government, and the public, through the Government, would suffer an unnecessary loss.

An equitable valuation of Class No. 3 property should have as its basis the economic worth of such property to the taxpayer, either for use in his going business or for sale. The allowance on Class No. 3 property should be

the difference between the cost of the facilities (less depreciation on account of wear and tear), and their economic value in the going business of the taxpayer, or their scrap value (or sales value) whichever is the greater.

It is only fair to say, however, that the officials of the Income Tax Unit apparently have not overlooked the fact that many wartime plants are now carried at such high values, due to war cost of construction, as to effectively prohibit their use in competitive peacetime production unless relief is extended, even though the facilities are in other respects easily adaptable to normal uses. This condition is a highly important factor in the determination of the amortization allowance to be made to any industrial organization coming within its scope, and no taxpayer is justified in assuming that the Income Tax Unit is not prepared to give it thorough consideration.

Only to One Return

That portion of Treasury Decision No. 2859 which provides that the preliminary estimate of amortization on Class No. 3 property must not exceed 25 per cent of the cost of such property applies only to the original return filed in 1919. Many taxpayers have gathered the impression that this clause definitely and permanently limits the amortization deduction against Class No. 3 property to 25 per cent of its cost. The claim for amortization on Class No. 3 facilities can be for any amount which, in the taxpayer's judgment, is reasonable and which can be substantiated by reliable data. The deduction for amortization in the return for 1918 (filed in 1919) was temporarily limited to 25 per cent of the cost of Class No. 3 property. This clause was undoubtedly inserted to prevent unscrupulous taxpayers from claiming unreasonable deductions against Class No. 3 facilities with the full knowledge that such deductions were not warranted, in order to save themselves, for the time being, the payment of their full share of Income and Profits Tax.

It should be understood that the original allowance for amortization as claimed by the taxpayer, or as allowed by the Income Tax Unit, is not necessarily final.

The law provides that "at any time within three years after the present war, the Commissioner may, and at the request of the taxpayer shall, re-examine the return and if he then finds, as a result of an appraisal or from other evidence, that the deduction originally allowed was incorrect, the taxes imposed by this Title and by Title III for the year or years affected shall be redetermined."

This provision gives the taxpayer full assurance that his claim will ultimately be settled under conditions which from all indications should be normal. Also it should be remembered that technically we are still at war and that the three year period will not commence to run until peace has been officially declared.

Article 185 of Regulations 45 prescribes the method of spreading the amortization allowance over the taxable periods involved. Primarily, the amortization allowance is to be spread over certain specified periods in proportion to the net income (computed without the benefit of the amortization allowance) from January 1, 1918, to the termination of what may be referred to as the "Amortization Period." The length, and therefore the termination, of the amortization period is ascertained separately for each class of facilities to be amortized, so that:—

(a) If the claim is based on Sub-division (1) of Article 184 the termination of the amortization period is the date upon which the property WAS permanently discarded.
(b) If the claim is based on Sub-division (2) of Article 184 the termination of the amortization period is the date upon which the property WILL BE permanently discarded.
(c) If the claim is based on Sub-division (3) of Article 184, the termination of the amortization period is April, 1919.

Reading the sub-divisions of Article 185 in connection with the kindred sub-divisions of Article 184, it appears that the amortization period on Class No. 1 property must terminate not later than the day upon which the 1918 tax return is filed (in most cases March 15, 1919), and the amortization period on Class No. 2 property must terminate not later than the day upon which the last installment of the 1918 Income and Profits Tax is due (in most cases December 15, 1919). It would seem from the wording of the regulations that no property may be classified as "discarded" unless the act of discarding took place on or before Dec. 15, 1919, and that facilities discarded after Dec. 15, 1919, must be allocated to Class No. 3 property. Attention is called, however, to the fact, that both Article 184 and Article 185 open with the words "for the purpose of making returns in 1919." It is therefore apparent that the ruling regarding the classification of discarded property is effective only with respect to returns filed in 1919.

If the taxpayer desires to discard his wartime facilities any time after Dec. 15, 1919, and within the three year limitation, he has a legal right to claim a reasonable allowance for amortization thereon, under the classification of discarded property.

Articles 184 and 185 could be made more explicit, and therefore much more effective, by classifying in one group all discarded war facilities, and all such facilities to be discarded within the three year limit prescribed by law, and by stipulating that when the claim is based on discarded property the termination of the amortization period becomes the date, or rather the average date, reported as the time when such facilities were discarded. Regardless of the limitation at present surrounding the termination of the amortization period it will, in most cases, be necessary to establish an average date of discard, and this date can be arrived at only by arbitration between the representatives of the taxpayer and the officials of the Income Tax Unit.

The question has been asked many times as to just what disposition must be made of wartime facilities in order that they may properly be said to be "permanently discarded." The Bureau of Internal Revenue has never officially defined the term "permanently discarded," but it seems to be the consensus of opinion that amortizable property need not actually be destroyed or dismantled in order to come within the meaning of the wording used in Article 184.

If a plant, or a building, or even a piece of machinery, is not now in use, and if, in the judgment of the taxpayer, the facility will not again be utilized it may be termed "permanently discarded," even though it is not ripped out and reduced to scrap. It may be cheaper for the taxpayer to allow his discarded property to stand in its original location than to undertake reducing it to scrap. It would seem to be immaterial whether the property is left standing or whether it is dismantled. But is the property again to be used? The answer to this question is the deciding factor in allocating amortizable property to the sub-divisions of Article 184.

Article 185 specifies that the close of the Class No. 3 amortization period shall be April, 1919. There appears to be no special reason for the establishment of April, 1919, as an arbitrary date for the termination of the amortization period on Class No. 3 property. The choice of the date undoubtedly has its inception in sub-division No. 3 of article 184, which establishes April, 1919, as the time for the determination of the reproduction cost of war-time facilities. However, as has already been stated, sub-division No. 3 of Article 184 has been amended by Treasury Decision No. 2859 and, under this amendment, April, 1919, is no longer a factor in determining the allowance for amortization on Class No. 3 property. Just why Sub-division "C" of Article 185 was not amended, at the time Treasury Decision No. 2859 was issued, so as to provide a new basis for the determination of the amortization period on Class No. 3 property is unknown. It is believed that the mention of April, 1919, in Sub-division "C" of Article 185 was simply overlooked at that time.

The amortization deduction is an abnormal deduction arising out of unusual conditions surrounding the construction, erection, installation or acquisition of wartime facilities. It is only fair to allow the deduction to be spread, on a basis of net income, over the entire period during which such facilities were operated as war production units, with the understanding that no deduction may be made for amortization prior to Jan. 1, 1918.

This principle was recognized in establishing the amortization period covering discarded facilities. It will be recalled that the amortization deduction is to be spread, in the case of discarded facilities, from Jan. 1, 1918, to the date of discard. In other words, the deduction on discarded property is to be applied to the period during which such facilities were actually used in war-time production. The present ruling that the amortization allowance on Class No. 3 property must be spread between Jan. 1, 1918, and April, 1919, is not equitable. In its place should be substituted a ruling permitting the amortization period on Class No. 3 property to run from Jan. 1, 1918, to the date upon which the facilities ceased to operate for war-time production. This ruling would enable the taxpayer to apply his amortization allowance on Class No. 3 property against the revenue arising out of the use of the facilities to be amortized.

Taxpayers, in order to receive the full relief accorded to them by law, should keep adequate book records of all war-time facilities subject to amortization, for it is only through the maintenance of such records that the taxpayer can hope to receive proper consideration from the officials of the Income Tax Unit should economic conditions make it necessary to reopen the claim for amortization within the three year limit.

The law specifies that the deduction for amortization must be reasonable. It is, of course, impossible to give a general formula for determining whether or not a given claim is reasonable. Each individual case has its own peculiarities and must be decided strictly on its own merits. The Income Tax Unit employs a staff of appraisal engineers, as well as a staff of competent accountants, whose time is devoted entirely to the settlement of amortization claims. It is the duty of the engineers, working in conjunction with the accounting staff, to determine scrap value and economic value in use, and to arbitrate their findings with the representatives of the taxpayer so as to arrive at a mutually agreeable basis of settlement.

In establishing a reasonable allowance both the accountants and the engineers of the Income Tax Unit have many factors to consider. For instance, in studying economic value in use with reference to Class No. 3 facilities in a given case the Amortization Staff would consider, among others, the following factors:

Cost.
Depreciation and obsolescence.
Extraordinary and unusual cost items.
Scrap value.
Second-hand sales value.
Rental value.
Adequacy under post-war conditions.
Surplusage of facilities.
Units produced during the war period.
Units produced at the time of the investigation.
Possible units to be produced in the future.
War-time employment of skilled and unskilled labor.
Peace-time employment of skilled and unskilled labor.
Convertibility of facilities.
Cost of conversion.
Economic value under competitive conditions.

All of these factors cannot be applied to every case—neither can each factor be given the same relative weight in the settlement of every claim. Many cases will require consideration of factors not enumerated above. It is therefore apparent that the determination of what constitutes a reasonable deduction is largely a matter of judgment and that it can only be arrived at through discussion by and arbitration between representatives of the taxpayer and the officers of the Income Tax Unit.

The taxpayer cannot exercise too much care in the preparation of amortization claims. He cannot present too much detail, provided, of course, the matter is well indexed. The Amortization Staff of the Income Tax Unit has innumerable claims to settle and cannot devote too long a time to the settlement of each individual case. The taxpayer should not expect that a lump sum claimed for amortization, supplemented by little or no data, will be allowed by the officials at Washington. The regulations of the Commissioner place the responsibility for the compilation of amortization data strictly on the taxpayer. If the taxpayer submits a claim which is not adequately supported by facts the Amortization Staff will probably disallow the claim in its entirety and notify the taxpayer that the matter cannot be reopened until full details are supplied.

The fact that complete information must be furnished to the Commissioner should not deter any taxpayer from filing a claim for the full amount of amortization which he believes himself entitled to. No claim is either too large nor too small to receive the attention of the Income Tax Unit. A screw machine may be amortized just as a complete plant or a series of plants may be amortized. The Commissioner will entertain any reasonable claim provided it is properly presented.

As a means of providing for the present shortage of skilled labor in France a law has been promulgated providing for the creation of technical classes for youths under the age of eighteen employed in factories. Employers themselves have the right to establish classes, but where this is not done the classes must be instituted by the Chambers of Commerce or by professional groups with funds provided partly by the State. There is a general feeling that the State should not be permitted to monopolize the instruction, and employers are therefore urged to provide the instruction themselves as part of the technical training of their workers.

Making a Going Vehicle Out of the Legislative Committee

A New Jersey committee was so successful, after stopping to reconcile and co-ordinate apparent differences, that it was named as a permanent organization to suggest, as well as influence, legislation.

By Clyde Jennings

THERE is some highly interesting and constructive information in the recent defeat of Senate Bill 331 in New Jersey for those of the industry who are interested in legislation. We do not know just exactly who is interested in influencing legislation, but we do know that practically everybody in the industry should be. There will be 42 legislatures in session early in 1921.

This number of legislatures means many new and some very wild bills to be met with cold facts, regardless of the situation that already is developing in the National Congress. It means busy times for the automotive patriots who will seek to properly direct legislation. We hope there will be many such.

In New Jersey, Senate Bill 331 was designed with the sole purpose of increasing automotive registration fees on an average for all classes of vehicles about 50 per cent. The drafting of this bill followed a request of the county highway organizations for help in the construction of roads. The bill appeared to be rather popular with the members of the Legislature and it was the feeling that, in keeping with general sentiment to tax automobiles and trucks more heavily, it would be passed.

A Legislative Committee representing the various automotive interests in the State was formed to oppose the bill. The members of this committee were asked to prepare their arguments and meet for a conference. This meeting turned out to be a rehearsal of what each member of the committee planned to say, and it was found that the representatives of the industry did not agree.

The ideas ranged from that of the engineering group, who would scientifically rate trucks according to their effect on roads, to that of the member with political experience who would fight the proposed increase by demanding a reduction of fees and then compromising.

So the Legislative Committee went into a conference and a general compromise was effected on how the bill was to be opposed. In the end, a member of the committee was selected to write a statement of sufficient length to present the agreed-upon view. Each member of the committee was assigned a topic concerning which he was to speak in elaboration. On this committee were engineers, manufacturers, dealers, truck users and car owners. So the discussion of the subject was well rounded out.

Then the committee adjourned to reconvene on the morning of the day when it was to meet the Senate Committee that was to hold the hearings on Senate Bill 331. In due time the members of the Legislative Committee again assembled in executive session and the principal speaker selected at the first meeting read his argument. The other members each said or read his piece. All were criticized and each went into the hearing in the afternoon prepared to do his part. And right well each did it, and the Senate Committee then and there voted against the proposed bill.

This incident is cited here as a good method of preparing for such hearings and of doing effective work. Certainly there must be an agreement among the opponents of any measure. Confusion in any cause is equivalent to defeat. A confused defense is often worse than no defense at all. Legislators are only human, after all. If these men see that the industry, including the users of vehicles, cannot agree upon what is right and fair, they are likely to follow the line of least resistance and pass the bill, no matter what it may be.

The chief statement in the New Jersey case was prepared by Harry Meixell, Jr., of the National Automobile Chamber of Commerce, who fortunately, is a citizen of New Jersey and had done much work on the road system of that State. He was entirely familiar with the topic.

Meixell's treatment of the topic was quite rational. Instead of basing his argument on the subject of fees alone, he reviewed briefly the history of highway legislation in the State, showed how highways had always been considered as chiefly a local problem and brought out the point that increased use indicated chiefly that the highways were of more importance than formerly to the community.

He quoted figures to show the increasing fees paid by motor vehicles and that these fees had increased in keeping with the increased use of vehicles and the consequent increase in need of maintenance. He pointed out strongly that the rational use of such fees were to maintain, not build, highways. Also that the present demand for aid from the local highway units, such as counties, would require a much greater sum than could be raised by such fees, if a maintenance fund was to be maintained. He emphasized strongly that should the local units be granted such assistance, it would establish a precedent for them to return next year for even greater assistance.

This argument, of course, was based on the theory that the main traveled highways are a State problem, just as is admitted by all well regulated highway systems.

Following this successful work, the New Jersey Committee was made a permanent committee on legislation for that State, with the distinct understanding that none of the organizations represented on this committee would approve or oppose any legislation until it had been discussed by the entire committee. The committee has extended its work by suggesting some legislation and drafting bills. California has a similar legislative plan.

Industrial Community as Foundation for Sound Industrial Relationships

A new industrial community has been built up along with a new automobile plant at Marysville, Michigan. Provision was made for the human element as well as for the mechanical elements in production and community life. Is beginning of an experiment worth attention and study.

IT is the interdependence of the various units of modern industrial organization that renders so complex the problem of the human element in industry. It is that factor which makes it necessary to judge every social theory and industrial relations plan not only in the light of its philosophical justice but also as regards the possibility of adapting it to conditions already present—or, what amounts to a different thing—of adapting present conditions to it.

It is not possible to do in regard to labor problems as one executive some time ago desired. He wanted to "just 'feather our own nest' and let the fellow across the street do as he likes." If this were possible, it might be a very desirable situation. All the plants whose executives had good ideas as regards industrial relationships would have perfectly satisfactory conditions; all the others would have their troubles within the limits of their own factory. Everyone knows that this is not the case. Every manufacturer is definitely affected by the way in which other manufacturers handle their labor problem; particularly is this true in a large city. And unfortunately for those executives who know what effective personnel methods are and desire to carry them out, the influence of many of their fellow manufacturers is harmful rather than helpful.

Because of these conditions, some manufacturers have attempted to break away from harmful environment as much as possible with the idea of being able to work out an intelligent personnel policy without having to bear the burden of ill-practice across the street. This desire, strengthened by the presence of other advantages, has influenced some manufacturers to establish their plants in a small town or even to go out into the open and build a town where none existed before.

The progress of several such experiments has been discussed previously in AUTOMOTIVE INDUSTRIES, and in each case that progress tended to show favorable results. The fact is worthy of note that another automobile manufacturer, trained in a very practical way throughout his long experience, is following out this same plan. This particular experiment has scarcely started so that no evaluation can be put upon its effectiveness at present. The beginnings of the development and the ideals behind them, however, are of interest to those who may wish to follow the future course of the development.

A Good Foundation

The first feature of interest about the development of a manufacturing center at Marysville, Michigan, by C. H. Wills & Co. is that work was begun on providing suitable homes and living conditions for men at the same time adequate housing for machinery and factory equipment was put under construction.

The story is told that when the Erie Canal was built, the man in charge of the construction work very carefully provided stables and fodder supply for the horses and mules which were necessary to the operations, but that no systematic provision for housing and feeding the workmen was made. The same practice is common even today, when chambers of commerce urge new industries to come to their city and start operations and trust to luck—which has been very bad of late—to obtain homes and suitable living environment for the men who must come to carry on the new manufacturing operations.

The builders of this new plant at Marysville, however, did an unusual thing; they thought out in advance the entire manufacturing problem, including that of the human element. C. Harold Wills, president of C. H. Wills & Co., feels very strongly that labor is never likely to be efficient unless it is contented, and that it is not likely to be contented unless it has a pleasant place in which to live and work. For this reason, the construction of houses and the development of a pleasant community has been completed in conjunction with the erection of the plant and equipment for the manufacture of the Wills-Saint Claire automobiles.

Community Development

The community development has been built up from a small village of about 150 people. It was necessary to clear some 4,200 acres, a part of which was wooded, and to lay out a town on entirely undeveloped land. Homes, school facilities, a recreation hall, and men's dormitories have been erected, so that every type of workman is provided for.

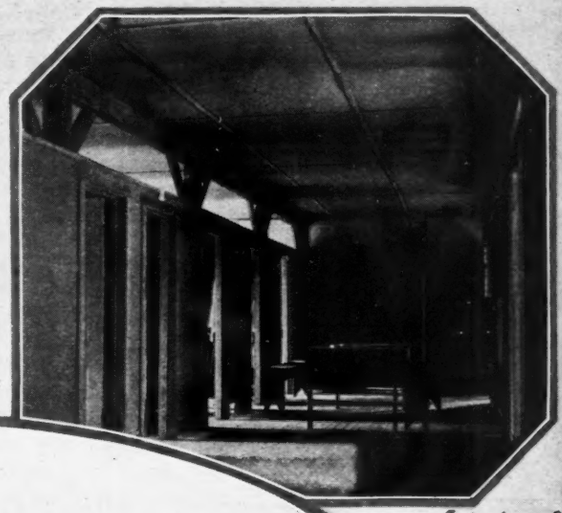
Each home site comprises a plot 40 feet by 120 feet, so that ample space is provided for a small garden or yard about each house. The houses differ from one another in construction, a variety of plans having been used in conformity with the best modern practice in community town building. The narrowest street is 60 feet wide and the widest 150 feet wide.

Modern sanitary conveniences are common to all the homes, while the town itself is equipped with excellent sewerage facilities, paved streets, sidewalks, etc. A central dining hall has been provided for the single workmen, so that their existence may be as comfortable and satisfactory as that of the married men.

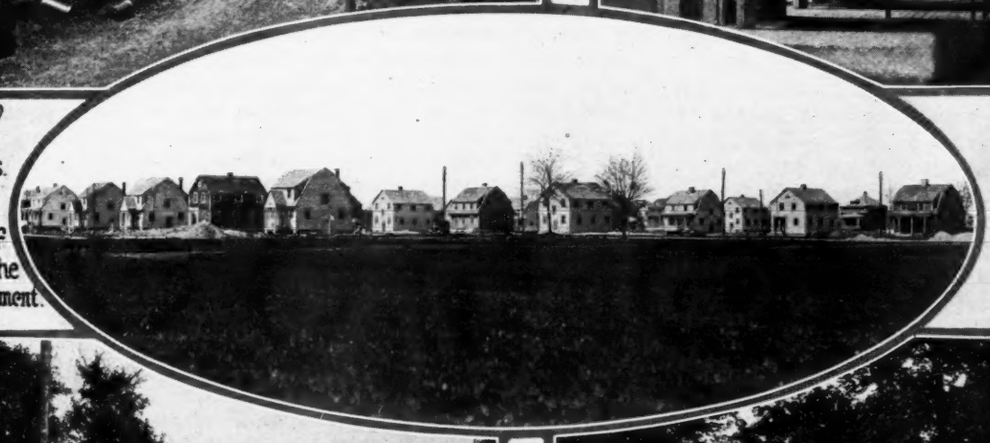
The new town is already occupied by some 4,000 persons, and 200 children are attending school in the town school house. The factory is ready to start production on January 1st, and both manufacturing and human needs have been met.

To those who have lived in construction camps and in new factory towns where community facilities were allowed to take care of themselves, it is easy to understand the future advantages which should be gained from this correlation of plant erection and community building.

A closer view of several of the homes.



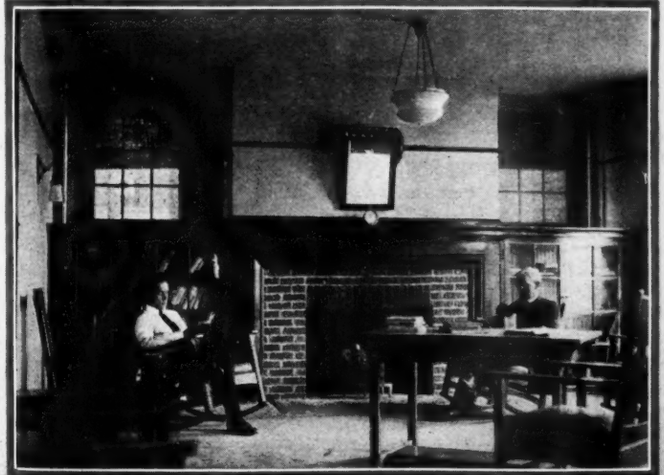
Interior of one of the dormitories in which the single men are housed.



A view of a part of the home development.

Recreation Hall, which was erected in one day by the concentrated efforts of the workmen at Marysville.

One of the more pretentious private homes.



Living room of one of the community houses.

Washington Boulevard, one of the main streets, under construction.

Under the old conditions, manufacturing in the new plant usually started with workmen who were there simply for the high wages which they could obtain; they cared for nothing about the plant or the company except the money they drew each week. This was necessarily the case, because there was nothing but money to care about.

Not only was labor turnover high, but since no one was enjoying life an undercurrent of discontent throughout the plant was inevitable. Later perhaps conditions would improve, but it is obvious that good relationships between employer and employees had to be built up on a foundation of dissatisfaction and unrest. The factory was starting its existence and beginning to make its tradition in an unfortunate manner. And that tradition inevitably carried on, making it always difficult, even in the light of later improvements, to overcome that first spirit of discontent which began with the plant.

Under conditions such as have been provided at Marysville, with facilities such that the workman can start a decent and enjoyable individual life along with a new job in a new plant, a strong and promising foundation for the development of good industrial relationships has been laid. "Everybody is happy" to begin with; it is much easier for co-operation and mutual help to develop between employer and employee under such circumstances. Consequently, the effort of the Wills company is worth special attention. It indicates an excellent conception of what constitutes proper industrial relationships. A firm foundation has been laid.

But, it may be objected, few firms have the necessary capital to do what this organization has done. That is true, but a firm foundation of a similar nature can be built with small capital, but with the same ideals. In such a case, the development would be similar to that of the Spencer Metal Products Company described recently in AUTOMOTIVE INDUSTRIES. The plant itself must then begin on a very small scale, and must develop in conjunction with the community. The chief point is that the working force of the plant needs to be in some reasonable proportion to the facilities of the community for providing opportunity for a decent and broadening existence to the majority of workmen.

It has been pointed out that such a foundation as laid by C. Harold Wills at Marysville gives excellent promise of a successful industrial relations policy. The foundation is a large factor. It is not, however, the only factor, by any means. In any situation, such as this, there is the same possibility for exceptionally bad development of human relationships as there are for exceptionally good ones. The situation in Maryland mining towns may be cited as a glaring example.

Interdependent Units

The interdependence of the units of modern industry, previously referred to, is already being illustrated by the coming of other manufacturing plants to Marysville. The Athol Manufacturing Co., manufacturers of automobile fabrics for tops and upholstering, has built a plant near to the automobile factory, and will manufacture products chiefly for the Wills company.

The Illinois Tool Co. has erected a plant to manufacture tools, jigs and fixtures, and began operations in December. Transue-Williams Co., Aluminum Manufacturers, Inc., are other newcomers. The Marysville Supply Co., which supplies material to the home builders, and an Edison Company power plant will also bring additional workmen and other labor policies to the new attempt at making and operating a model industrial community in this country.

But upon the firm foundation such as has been laid at Marysville, there is every opportunity for the application of those factors of fair-play, utter honesty, and fundamental justice in administration of personnel work that go to make up a really successful labor policy. Both the present status and the future development of the Marysville community are worthy of serious and thoughtful attention. The development of such an intelligent and seriously applied "big idea" is always worth following.

Noted Artists Portray "Spirit of Transportation"

RATHER an unusual hotel attraction for the automobile shows will be provided this year in the form of twelve paintings entitled "The Spirit of Transportation." The paintings are being made by twelve artists, each of whom is well known in his particular type of work. The purpose of the paintings is to visualize in a vivid and dramatic manner the place of the automotive industry in transportation and its relation to the economic and industrial life of the world.

The artists represent portrait, landscape, figure, marine, and mural artists, etchers, and also popular illustrators. They are doing this work at the instance of the Clark Equipment Company, and each has portrayed in his own way "The Spirit of Transportation."

The paintings will be on exhibition in the main lobby of the Hotel Commodore during the New York show, and will also be exhibited during the Boston and Chicago shows.

The artists whose work is represented in this prize competition have been selected from the prominent and talented artists of America representing the four branches of art as follows:

Portrait, Marine and Landscape Painters—George Elmer Browne, Jonas Lie, Max Bohm.

Illustrators—Frank X. Leyendecker, C. Coles Phillips, James Cady Ewell.

Mural Painters—Maxfield Parrish, Alphonse Mucha, F. Luis Mora.

Etchers—Franklin Booth, R. F. Heinrich, William Mark Young.

Added interest is given to the exhibit due to the fact that in addition to the remuneration which each artist has received for his painting, a competitive interest has been awakened among them by reason of a capital prize of $1,000, which will be awarded the artist whose painting is esteemed the best. A Jury of Award consisting of the leaders of the automotive, marine, and railway industries will view the paintings while on exhibiton and will award the prizes.

The second prize is a Silver Medal of Honor and to the third goes Honorable Mention.

This effort is an attempt to bring home to the nation the vital part which transportation as a whole and automotive transportation in particular has played and will play in the development and progress of civilization and has in this manner shown its appreciation of the contributions to transportation and world advancement made by the American automotive industry.

An Analysis of the Nebraska Results

Editor AUTOMOTIVE INDUSTRIES:—

As you know, there has been considerable talk about the tractor tests held at the University of Nebraska, and nearly every paper is publishing the results as they come out. These tests are probably the most exhaustive and complete that have ever been made in the tractor industry by any university, and we believe they will become the subject of considerable engineering comment, and the source of much information about the tractor.

One thing none of the papers have done so far, and that is to digest the results in such a form that a quick comparison can be made of the different tractors. We have made a digest of the twenty-four three-plow tractors tested by the University, and the results are really very interesting, not only from our own viewpoint, but from other viewpoints.

The great amount of reserve power which practically all of the three-plow tractors showed under actual test, in comparison with their rating, is certainly very creditable to the industry in general.

In the accompanying table the first column, showing draw bar horsepower, tells the farmer and dealer what they have to work with in the field, because regardless of how it is arrived at, draw bar horsepower is the only thing you need in the field to do any pulling.

The last column, giving the number of cubic inches displacement per minute per draw bar horsepower, shows the farmer and dealer about what he can expect in regard to fuel consumption under average conditions. This column tells how many cubic inches of gas must be used every minute to make one draw bar horsepower.

The bigger the number of cubic inches of gas that must be used to create horsepower, the more fuel will the tractor require per acre to work. As a matter of fact, nearly all these three-plow tractors made a very good showing, because some of the two-plow tractors ran up, we believe, as high as 35,000.

Bates Machine & Tractor Co.
Harry H. Bates.

[While we agree with our correspondent in a general way, we wish to point out that piston displacement is not an absolute measure of the fuel consumption, because in the different engines the combustion chambers will not be filled with mixture of the same density, and, besides, the mixtures will not all contain the same proportion of air and fuel.—EDITOR.]

Bates Machine & Tractor Company's Tabulation of Nebraska Tractor Tests

Tractor	Maximum Drawbar Horse Power	Per cent Belt Power at Drawbar	Maximum Belt Horse Power	Weight	Cu. in. Displacement of Motor	Cu. in. Displacement per minute per drawbar H. P.
Bates Steel Mule 15-22	23.19	77	29.78	4600	280.6	14338
Rumely 16-30	22.90	68	33.52	9506	653.3	15219
Wisconsin 16-30	22.22	70	31.50	6060	510.5	21297
Case 15-27	21.81	69	31.23	6460	381.7	14835
Avery 14-28	21.52	67	31.83	7540	470.4	17705
Aultman Taylor 15-30	21.19	61	34.37	8240	510.5	22742
Hart Parr 30	19.65	62	31.37	5450	464.5	17065
Frick 15-28	19.48	65	30.00	6100	425.3	19431
Gray 18-36	19.15	59	32.20	6510	478.4	24981
Wallis 15-25	18.58	62	29.87	3500	326.3	17263
Twin City 12-20	18.43	66	27.93	5000	340.4	18469
La Crosse 12-24	17.83	71	24.94	4670	395.8	19001
Avery 12-20	17.58	72	24.26	5500	360.8	18527
E-B 12-20	17.55	67	25.90	4355	354.4	18174
Moline 9-18	17.40	63	27.45	3590	192.4	20124
Huber 12-25	16.70	65	25.70	5550	365.8	20809
Minneapolis 12-25	16.26	61	26.24	6600	445.3	20977
Waterloo 12-25	15.98	61	25.97	6183	464.5	21746
Coleman 16-30	15.87	52	30.41	5100	510.5	30552
Titan 10-20	15.65	55	28.15	5708	530.8	18315
Cletrac 12-20	15.52	62	24.94	3300	276.5	23893
Case 10-20	15.28	67	22.81	5080	381.7	23731
Rumely 12-20	15.02	58	25.87	6638	452.3	17315
Heider 12-20	13.43	55	24.24	6200	429.4	28775

Hydraulic Dynamometers

Editor AUTOMOTIVE INDUSTRIES:

The writer's attention has been directed to an illustrated item on page 865 of your Oct. 28 issue regarding the testing of a Hispano-Suiza chassis by a Froude dynamometer testing set, and also to Mr. Scott's letter on page 1031 of your Nov. 18 issue.

It will probably be of interest to state that Froude dynamometers are now being manufactured by the C. H. Wheeler Manufacturing Co. at Philadelphia, and that a Froude chassis testing set (made in U. S. A.) will shortly be installed at the plant of Rolls-Royce of America, Inc., at Springfield, Mass.

H. HYATT.

L. G. O. Co. Builds Own Bodies

Editor AUTOMOTIVE INDUSTRIES:

We notice in your issue of Nov. 11 that a description is given of a motor omnibus body with steel frame, and the second paragraph of this description reads:

> "the body referred to was designed and built for the new "K" type London motor omnibus."

We feel sure it is not your desire that a misconstruction should be put upon this sentence, viz. that the bodies of the "K" type omnibuses as used by the London General Omnibus Company in London are of this special steel construction, as is suggested in the article referred to; we beg to point out that the body we fit to every one of our "K" types is our own design and construction.

Only one steel body for a "K" type bus was supplied for trial by the Aircraft Construction Company of London, but we cannot yet say if there are any advantages or otherwise over our own construction for public service work.

The "K" type bus body as used in public service in London is our own design and construction and is not a steel body.

GEO. J. SHAVE,
Chief Engineer,
London General Omnibus Co.

UNDER the new British law for licensing motor vehicles, it will be impossible to misrepresent the age or history of a second-hand machine. A log-book will be issued to each owner. This book will give the history of the vehicles in a manner similar to real estate deeds. This method will have the additional advantage of rendering difficult the disposal of stolen machines.

Efficient Handling of Heavy Castings in Tractor Plant

An overhead carrier system and specially devised hooks and hitches are the chief factors in the effective system for handling heavy castings developed at a tractor plant in the Middle West. Production is aided by the conservation of man-power and the efficient movement of castings.

By Norman G. Shidle

TO obtain the most work with the fewest men is the object of every effective production system. Much has been accomplished in this direction by the development of a number of novel hooks and hitches for use in handling heavy castings at the Allis-Chalmers tractor plant. By means of these hooks, used in conjunction with a carefully planned overhead track system, castings weighing between 400 and 700 lb. can be readily transported from one phase of production to another without excessive effort and with a minimum working force.

Specially constructed hand trucks are also utilized in certain parts of the work, where a carrier system of any kind is not feasible. These trucks are specially constructed for the particular castings to be carried, so that an ordinary man can transport very heavy castings without the use of excessive strength.

The methods devised have in every case been suited to the particular conditions and necessities of production in this particular plant, but a detailed description is of interest as showing what is possible along these lines as a result of careful study. Excellent results have been achieved at small expense, a desirable attainment in any factory.

Among the heavy castings which must be moved about at this factory are:

1. Transmission cases.
2. Cylinder blocks.
3. Crankcase bottoms.

A description of the way in which these castings are handled will admirably illustrate the principles involved.

Considerable time and effort is saved in handling heavy castings, such as the transmission cases, during the milling operations. For milling such castings, two Ingersoll milling machines are used. These machines are illustrated in Fig. 1. The larger one, located on the right of the photograph, carries five horizontal and two vertical spindles; the small one to the left has seven horizontal spindles.

The large machine carries for transmission case castings two fixtures, set some distance apart. The casting is brought to the machine by means of the overhead conveyor system, which was installed by the Louden Manufacturing Co. It is held by means of a specially designed hook, so devised that the casting can readily be lowered into the proper position for milling.

The photograph shows a casting already lowered into the forward fixture. As soon as this casting is chucked, the machine is started. The operator then removes the casting, which has already been milled, from the rear fixture, and chucks another one in its place while the milling operation is being performed on the casting just placed in the forward fixture.

When the first casting is finished, the quick travel on the machine is used to bring the second one up to the cutters. The first casting then back of the housing is removed. When the second casting is completed, the table is run out and the operation repeated.

Because of the effective use of the special tackle blocks and hooks, the operator is able to hoist up another casting, take out a casting, and lower it while the machine is in operation. By the use of this method, no time is lost except that consumed in lowering into the fixture and chucking the first casting.

The casting is stored and handled with the bell end downward. Since the operation described above is performed in a horizontal position, the special hooks were designed so that the casting can be lifted bell-end down and then turned through an angle of 90 deg. One of the hooks used for this purpose appears in front of the large milling machine. The exact construction of this particular hook is not of special interest, since a slightly different casting might call for an entirely different kind of hook. In this particular case, the opening on the upper side of the casting was found just large enough to allow for connecting the hook directly with a hinge pin located at the center of gravity of the casting.

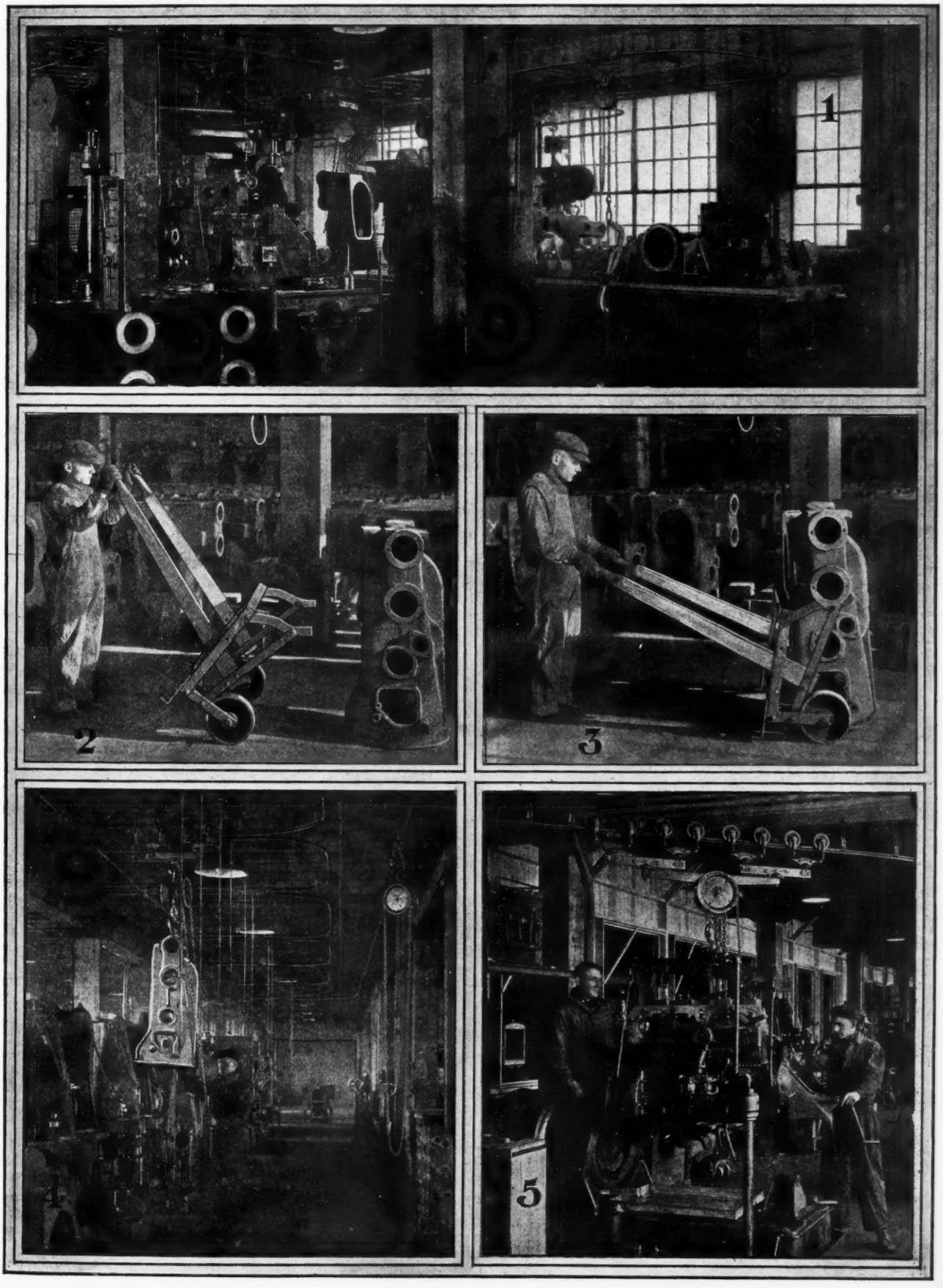
When the transmission case leaves the large miller on the right of the photograph it is conveyed by means of the overhead system to a smaller miller for the second operation, and thence by the same means to the boring machines. The overhead system comprises a number of switches in addition to the straight track, and was carefully designed to fit the particular production needs of this factory. The layout was somewhat complicated by the fact that each of these machines must handle a variety of castings, and that the routing of these castings varies as well. It was possible, however, to so map out the track system as to attain a maximum of efficiency.

The use of this system in connection with the milling operations is typical of a number of other operations. These special hooks and the carrier system are adapted throughout the plant, however, in a number of other ways.

Castings are transported from the shipping platform to the receiving room, and in some cases from one part of the shop to another, by means of the hand truck similar to the one shown in Figs. 2 and 3. The truck shown here is used for carrying transmission cases. Its construction is shown clearly in Fig. 2, the arms being so designed as to be specially adapted for moving this particular casting.

The operator runs the truck forward so that its curved

Special Hooks Aid Overhead Track in Handling Castings



arms come under the shoulders of the casting. He then pushes down on the handles. This slight effort raises the casting about one inch from the floor and leaves it in perfect equilibrium as shown in Fig. 3. This casting weighs about 650 lb., but is handled quickly and easily by one man with little exertion on his part.

An exceptionally good example of the efficiency obtainable through a combination of these special hooks and the overhead carrying system is shown in Fig. 4. Each transmission case must pass through each of the six Foote-Burt drilling and tapping machines in this line. Some of these machines have very high pilots over which the castings must be lifted, so that a roller system would not be practicable.

The casting is raised on the tackle blocks for the first operation, and is carried through the six operations without being lowered to the ground and without having the hooks detached from it. By means of curved track and switches, the casting is quickly moved from one machine to the other. It runs into the fixture directly in front of the machine. Over each machine there is a stub track, joined to the connecting loops by two-way switches.

When the last operation has been completed, the casting is lowered to the floor and the tackle is run back on a straight track. In full production on these machines, six tackle blocks being used, six castings can be run through by this means at the same time.

The Louden overhead system is also used to advantage in the room where the engines are given the block test. The system is so arranged here that a side track runs from the main line into each of the testing blocks. Thus the 1700 lb. engine is readily handled and moved from one place to another. The system is particularly useful here because this big tractor engine is too heavy to be handled in the revolving engine stands common to automobile factories. The use of the carrier system in the block test room is shown in Fig. 5.

Cylinder blocks constitute another heavy casting which must be moved about efficiently. One method of doing this is by means of the overhead system and the specially constructed hook shown in Fig. 6. Another type of hook used on cylinder block castings is shown in Fig. 7. The hook is so constructed as to carry the casting and allow it to be placed in the machine in the proper position for machining. In Fig. 7, for instance, the casting is about to be lowered into a boring machine. This is at the beginning of the cylinder block boring and drilling line, which includes nine machines. These operations follow directly the milling operations and completely finish the cylinder block so that it is ready for the assembly line.

A special truck has also been constructed for moving cylinder block castings. This truck is shown in Fig. 8. It enables one man to move this 440-lb. casting with ease. To the framework of the truck are pivoted four pairs of hooks which normally lie flat. They are raised to the position shown in the photograph by a foot pedal at the rear of the truck. The truck is pushed up to the casting, and the hooks, when raised, catch hold in their proper places on the casting. The rods connecting the hooks to the pedal have weak coil springs. When the truck is pushed up to the casting, with the handles raised and the foot pedal depressed, the pair of hooks enter the hand holes; the other three pairs go forward only until they come in contact with the casting. The operator then lowers the handles, and the casting comes to balance in the position shown in Fig. 9. The truck is so constructed that it can catch the cylinder blocks from any position.

A special hook for crankcase bottoms is shown in Fig. 10. These castings are nearly pointed on one end and are handled and stored on the bell end. This casting weighs about 160 lb., and like the other casting described, formerly required the efforts of two men in order to move it about.

To place this casting in the drilling and boring machines shown in the illustration, it is necessary to place the bell end up. It is for this task that the special hook was constructed. Fig. 10 shows the casting raised from the floor with the bell end down in the position in which it had been stored. Fig. 11 shows the casting in position to place in the machine for drilling. When this casting has been drilled, it is moved to the tapper, which appears in the foreground of the illustration. When tapping has been completed, the casting is turned back to its original position with the bell end down and is placed on the floor. By means of this hook, the operator is enabled to do all hoisting while the machining operations are being performed.

The effective methods in use for handling heavy castings at the Allis-Chalmers plant are due chiefly to the use of the special hooks and hoists, and to the efficient layout of the overhead carrying system, all of which is the work of the shop organization. It is necessary to adapt the carrying system to the specific needs of the plant, and this has been effectively done in this case. The track can be bent without heating into any sort of an irregular curve, and for that reason adapts itself to such special installations.

All the developments described tend toward the desirable end of removing from the workmen the necessity for excessive physical strain, thus enabling them to utilize their energy in ways more productive to the management. This has been an additional factor in rendering these methods useful as an aid to production.

Naphthaline Solutions as Motor Fuel

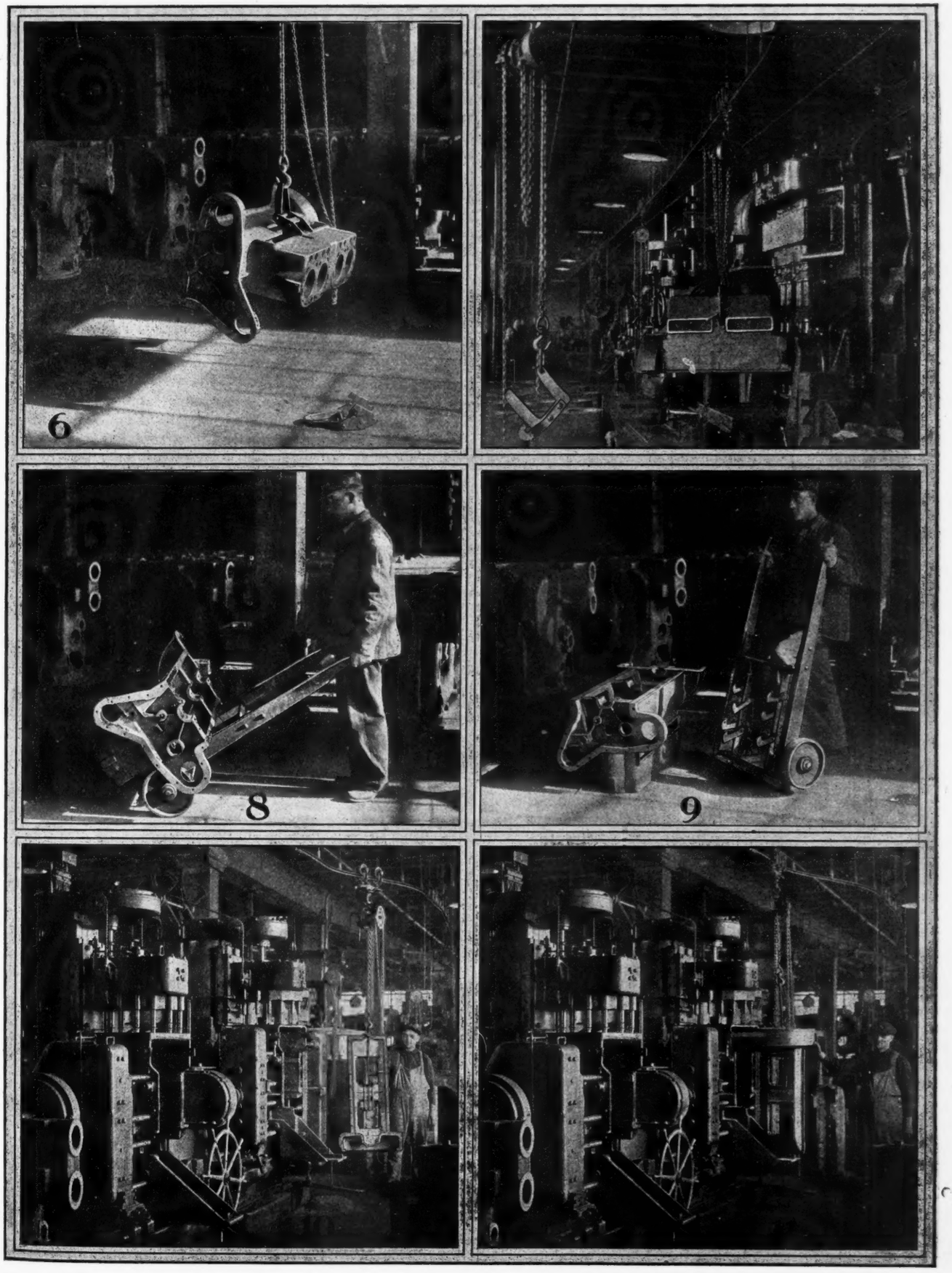
IN a paper by L. S. Palmer, presented before the Institution of Automobile Engineers, the advantages of naphthaline dissolved in benzol for use as motor fuel are discussed and conclusions drawn from experimental investigation. The work was based on the suggestion that the heat content of the usual oil fuel could be increased by dissolving acetylene gas in it. The coefficient of absorption of acetylene gas being known, this enrichment can be easily calculated. With commercial benzol the gain in heat content figures out to only 0.02 per cent and the scheme is therefore of no interest. With gasoline the gain is still less.

These figures made it apparent that in order to get a solution with an increase of any practical value a greater weight of solution with high heat content must be used. Experiments were therefore carried out with naphthaline solutions in benzol with the object of obtaining an efficient cheap fuel of high calorific value and of investigating the possibility of the efficient combustion of solid fuels by means of solution. The experimental work was carried out by means of a Douglas 2¾ hp. motorcycle engine. The following conclusions were reached:

(1) Naphthaline dissolved in benzol to a strength of 15 per cent by weight forms an efficient fuel for ordinary gasoline motors, and though about 6 cents per gallon cheaper yields 3.4 per cent more mileage than commercial benzol.

(2) A solution, rather than a mechanical mixture, forms an efficient method by which solid or heavy liquid fuels can be conveniently burnt in ordinary internal combustion engines.

Other Specially Made Hooks and Hoists



Seeking a Fair Basis for Compensating the Worker

History, it seems, sheds little light on how the wage should be adjusted. It tells us of the equitable custom of the individual worker, which has been cast aside in the days of machinery. Our present forced methods of adjustment are not an equity basis.

By Harry Tipper

NOT long after finishing the article on wages which appeared last week, a gentleman came into my office and discussed this very subject. A particular point of his discussion was a question, and the question was: "Is the cost of living a proper basis for estimating the fair valuation of wages?" This lead us into a general discussion of the present wage systems and how they rose. The desire of this gentleman for information indicated that the subject might be worthy of further consideration in these columns.

A good many books have been written upon the wage systems and various outgrowths of these general systems. There is a great deal of current discussion upon such matters, but very little analysis has been made of the factors out of which the present wage systems have grown, and the lack of any fundamental elements of valuation in the general backgrounds of the present system.

The object of all wage systems, of course, is to secure the fabrication of a unit with the expenditure of a minimum amount of labor cost. The value of the labor is a resultant of the relation between the quality and the quantity of the output and the amount involved in the wages for the fabrication of this output.

None of the present wage systems, however, are based entirely upon this relation and many of them have no direct connection with it at all. The general basis since the introduction of the factory system has been the amount which the supply of labor and the conditions of the industry made it necessary for the manufacturer to pay. This amount has been paid either on a general time scale, on a piece work scale, or on a combination of the two, and it has varied largely as the workers demanded it, and as they possessed enough power to enforce their demands.

In the days before the factory system was introduced the hand worker—being the sole producer of the job and owning his own tools—secured a return in proportion to the value and individuality of his own production; so that his own pay was strictly related with the value of the product which he made, and in this relation there was a better basis than that which has existed under conditions in the factory system.

This does not mean that the man's condition in those circumstances was better, but it means that there was a more stable basis of valuation because the work was more individual and the exact relation of the worker to the product was determined almost automatically.

When machinery was first introduced into the factories and the production standardized and subdivided to some extent, the variations in the individual's skill were so much less important than they had been under hand work methods, that wages tended to level themselves and workers were secured largely on the prices which had to be paid and not nearly so much selected upon individual skill.

The supply and demand as a basis of valuation has continued up to the present time, and for that reason it has been difficult to make any agreement between the wage earner's condition in the individual case, the cost of living which might be regarded as reasonable and the unit of work which he turns out.

If it were possible to analyze the operations entering into the production of a given article and to arrange the pay of each worker according to the number and quality of the units which are produced—including the supervision of this production and all the other departments which enter into its cost—then the worker's wage would relate to the cost of living at all times; because the same relation which had been observed between the labor and the unit of production would exist all down the line until the goods were bought for his consumption by the same worker.

The Socialist would say that I had mentioned the object of his theory, but the Socialist attempts to arrive at this point by fixing conditions and securing a uniformity where the problem requires the examination of related factors and the valuation of variables.

All time payments are arbitrary and are fixed upon an arbitrary scale which is justified by the immediate conditions of the business, or the relative power of the employer and the employee. They cannot at any time represent more than an average cost per unit of production, and as a natural consequence they must lead to a general level of production from the individual workers employed on that job.

Where the payment is on a time basis and bears no exact relation to the individual capacity to production, it is to be expected that the labor organizations would have a tendency to lean toward limited production, because the workers themselves would hesitate to use their full capacity if it expressed considerable departure from the average ability.

Where the wage systems are based upon piece work, the relation between the individual capacity to produce and the wage given to the producer, is more direct and justified to a larger extent. It is not exact, however, because the base rate is arbitrary and has been fixed by the immediate conditions so that the fluctuations are only within certain limits. It is much better, however, as a system of payment than the time payment system where it can be adopted, and where the value of the individual operations,

relatively to each other, can be determined with a reasonable degree of justice.

The object of industry is production; more production per man. And unless the wage system rewards the man in proportion to his production, it may not further the object of industry to any degree, and increasing conveniences may lead to a reduction in individual efficiency.

Basing the wage cost upon cost of living is just as arbitrary a matter. In fact, it is a good deal less satisfactory than the attempt to base wages upon the supply and demand, because the cost of living is dependent upon the kind of life and the individual circumstances of life. It is dependent upon the amount of production and the relation which exists between the conveniences and comfort which a worker may possess—in other words his cost of living—and his wage is the result of his production effort and not the beginning of it.

Entirely too much stress has been placed of late years upon the right to have a living wage, and the living wage has been scientifically discussed as though it could be measured by calories of food, by minimum air space in houses, by limitations of clothing and shelter.

The fact of the matter is that the cost of living is labor, either the labor of the man or the results of the surplus labor which his forefathers devoted to his inheritance. The conveniences which we possess to-day, even in the poorest of families, are the results of the release of labor in time and effort from the stern necessities of a former life, so that this labor could be engaged upon the production of additional conveniences. Pyramids, old cathedrals, Roman waterways, the irrigation systems of Asia Minor, prove that man could construct great works without modern machinery, but it took so much time and effort and human energy to do it that the progress was extremely slow. Conveniences of life and comforts of life are due entirely to the amount of production effort and its efficiency, and it is useless to attempt to turn the problem around and base the wage of the worker on the cost of his necessities.

Since the wage earner has organized more or less successfully he has acquired sufficient power in a good many industries in this country and in most industries of Europe to enforce his demands, in other words, to corner the supply by organization and make the demands through the power of that organization. For that reason the arbitrary basis upon supply and demand is only accentuating the problem in industry instead of solving it.

The attempt to meet the production necessities by using labor in accordance with the supply and basing its wages upon that, does not induce the worker to use his full capacity for production. It frequently bears no relation to the value of the work, to society, nor the amount of training and intelligence required in the preparation for it.

Teachers of the young are of more value to society and therefore to industry, than most of the men directly engaged therein. But this value does not find its expression in the wage which is paid to teachers, and while we cry for education we do not make much of an attempt to base its reward upon the need.

This is just a single illustration taken because it is sufficiently extreme to point to the absurdity. Until we are willing to take production service as a basis of reward and to analyze that service so that it can be determined in its individual relations, wage systems must continue to be arbitrary and in themselves ineffectual in inducing the worker to put forth his full capacity in production effort, incapable of removing the conflict which exists at all times and insufficient to provide a reasonable measure of justice for all workers.

Of all the systems for general wage payments which are being used at the present time, the ones which are predicated upon the relation between the individual and the quantity and quality of his production, are the most effective in their general application.

Progress

IS the world progressing or going backward? In the matter of industrial relationships, are matters getting better or worse? The question cannot, of course, be briefly settled. Certain recent trends, however, are highly indicative of progress in the right direction. It is almost agreed among serious students of the problem that the progress of human relationships in industry must go along lines which provide for more and more ample opportunity for the development of individual abilities, desires and intellects. Benevolent autocracy, though it may have its place in the development of industrial relationships, can never constitute an ultimate condition. Industry must eventually function *primarily* for the good of society as a whole.

The declared principles of many bodies and individuals, prominent on the employers' side of the industrial field, have within the last few years given strong indications of progress. The principles laid down last year by the Cleveland Chamber of Commerce voiced the idea that the interests of the public were to be considered as prior to those of individual groups of employers or employees. H. L. Gantt said: "Business has its foundation in service, and as far as the community is concerned has no reason for existence except the service it can render." Nearly every declaration of principles in recent months by any body of representative employers has contained this sentiment.

Twenty years ago a man making such a statement would have been publicly scoffed at as an impractical idealist. To-day he is only privately scoffed at. Progress is to be noted in the fact that while a majority of employers do not actually believe in the practical working out of such principles, they no longer dare dispute them openly. The battlefield is being changed. When a great firm or great industry is accused of unfair tactics, it must now attempt to justify itself on the grounds of social service as well as on merely legal grounds. Twenty years ago our current philosophy enabled a company to fully justify its practices by proving that it had kept within the law. To-day, it must justify itself as well on the grounds of moral justice and social service. The trend taken by the fight of the packers and the coal barons furnish the most striking current examples.

The progress lies in this. While we have not actually gone very far in the direction of conducting industry primarily as a social service rather than as an opportunity for individual gain, we have at least shifted the basis of judgment. Gradually it is coming about that all business practices must be judged on the basis of this new conception. It is difficult to defend many current practices on that basis. But attempts to do so will be made for some time. Finally, however, it will become more difficult and more costly to defend these practices than to abolish them —and then they will be abolished. Thus we will have progress in spite of ourselves.

Consequently it is right to say that the world is getting better—for social pressure and community of thought and effort is becoming stronger.

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Horace M. Swetland, President
W. I. Ralph, Vice-President E. M. Corey, Treasurer
A. B. Swetland, General Manager
U. P. C. Building, 239 West 39th Street, New York City

BUSINESS DEPARTMENT
Harry Tipper, Manager

EDITORIAL
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P. M. Heldt, Engineering Editor
Herbert Chase Norman G. Shidle

DETROIT OFFICE
J. Edward Schipper

WASHINGTON OFFICE
816 Fifteenth St., N. W.

BRANCH OFFICES
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On the Level

AMERICAN manufacturers are essentially fair fighters. Courage, sometimes tempered with harshness, has been perhaps the dominating note in the development of American industry. But in most cases that courage has been exercised in fair fight and the spoils gained have been fairly won, judged by the standards of the time in which the battle was fought. And this heritage of courage and fair fighting still characterizes the majority of men engaged in manufacturing to-day.

The exercise of this spirit of fairness becomes intensely important just now in connection with the wage question. The rights or wrongs of wage reductions cannot be discussed in these few lines. The general principle may be laid down, however, that the manufacturer must act frankly and openly in whatever action he may take if he is to avoid laying up for himself a store of future trouble. This matter was more fully discussed in one of Mr. Tipper's articles recently.

No one can be expected to enjoy a reduction in wages, but the necessary disappointment that goes with such reductions can easily be fanned into a spirit of distrust and suspicion if the employer goes about it in the wrong way.

To announce that a plant must close down indefinitely because of slack business, to discharge the majority of the employees, and then to hire them back again at lower wages a week or two later is not an action which inspires confidence. The devil is a fast runner; it is difficult to beat him around the bush. When the manufacturer is about to do anything that affects vitally his employees, he will be far better off in the end if he tells them frankly what he is doing and why he is doing it.

But it must be remarked that profits should come down in proportion with wages if fairness all around is to be observed. And wages should follow, not precede, a very definite drop in all essential living costs.

Bureau of Standards Peace Time Activities

AT the end of the war some anxiety was expressed lest the wave of economy which was then sweeping Congress should result in the necessary appropriations being refused to allow the Bureau of Standards to "carry on." The facilities of the bureau had been increased largely during the war, and many Government departments had made extensive use of them. The expectation was natural that Congress in its endeavors to retrench would want to cut down the appropriation for the bureau's experimental work.

At that time an appeal was made to the industries which could profit by the scientific research work for which the bureau is equipped, and particularly the automotive industry, to bring influence to bear upon Congress to the end that the bureau should be given the means necessary for carrying on its work.

The first year of the bureau's activities under peace-time conditions since the war has recently been completed, and a report issued shows that much was accomplished during that period. More than one hundred thousand separate tests were conducted, of which slightly more than two-thirds were for the Government and the rest for the public. The research staff consisted of 381 statutory employees and 600 engaged in research and investigations specially authorized by Congress. Complaint is made that the turnover in personnel was quite large during the year, and it is suggested that this must be prevented in future by paying salaries commensurate with those paid in the industries and by educational institutions.

Continuity in personnel is an essential to accurate scientific work such as that conducted by the bureau. The skill required in making measurements of high precision, for instance, cannot be acquired quickly, hence the value of an investigator to the bureau must grow with his length of service. It is therefore to be hoped that the bureau will be placed in such a position that it can retain its experienced men and not be compelled to work largely with novices.

A considerable portion of the work of the bureau

during the past year has been in the interest of the automotive industry. The Automotive Power Plants Division is engaged in this work exclusively, and the new appropriation schedule prepared for Congress makes provision for considerable new equipment needed by this division. We are certain that the appropriations asked for will have the approval of the automotive industry.

Importance of Human Relations

THE use of the human relations idea in the advertisement of a prominent lathe manufacturer was commented upon some time ago in AUTOMOTIVE INDUSTRIES as significant of the importance now being attached to this phase of production by practical employers and executives.

Another example of this same tendency appears in a recent advertisement of the General Electric Company in *Iron Age*. This advertisement bears the caption—"Specialized industrial training eliminates mistakes that are costly in time and material." The text goes on to develop this idea and is illustrated with photographs of the training school for arc welders that is being operated by this company.

It is worthy of note that, even at this time of comparative business depression, the necessity for training men and building up an effective working force is being considered as of paramount importance by many successful manufacturers.

The "Saturation Point"

ONE of the bugaboos of the automobile trade for some time past has been the "saturation point." We have never seen it stated in print that this had been reached or was about to be reached, but, on the other hand, we have come across emphatic asseverations to the effect that it was nowhere in sight.

Now, just what is meant by the "saturation point"? The term "saturated" is used in science and industry in at least two entirely different ways. In chemistry, for instance, when we speak of a saturated solution, we mean a solution which under the particular conditions of temperature and pressure will hold absolutely no more of the material in solution. On the other hand, we speak of a magnetic circuit as becoming saturated when the increase in the induction ceases to be proportional to an increase in magnetizing force. It is then still possible to materially increase the induction, but it requires more effort for a certain increase than before.

The second phenomenon mentioned is no doubt a better parallel than the first to the condition which we will have to face in the automobile industry. We will never reach a point where it will be absolutely impossible to increase the number of cars in use, but the time must come when it will be more difficult to sell cars that represent an increase in numbers. This is entirely aside from temporary fluctuations in the market due to the state of general prosperity.

Naturally, as the automobile became a practical vehicle, the people most in need of rapid road transport and those best able to pay for it—perhaps the sequence should be the other way round—were sold first. Improvements in design and manufacturing processes constantly increased the automobile's potential field of usefulness. To-day in some sections of the country automobiles are in such extensive use that there are relatively few people left who can afford a car and still do not have one. But where in some states there is one car to every five or six people, there are other states in which the proportion is only one car to forty people. There is, therefore, still room for many additional cars, even on the supposition that in states like Iowa and Nebraska the saturation point has been nearly reached.

It should be emphasized, however, that the attainment of the saturation point does not mean the doom of the automobile industry. It only means that the industry is settling down to a stable basis. Practically all road transport will then be by motor car, and the industry will have before it the enormous task of supplying repair parts for the twelve, sixteen or twenty million cars—whichever turns out to be the number required for the road transportation of the Nation—and of replacing 10 per cent or more of these vehicles annually.

The "saturation point" should really not be the bugaboo that it apparently is, because when that point is reached the automobile industry will be on the same plane with other industries devoted to the production of prime necessities, many of which are normally in a prosperous state.

Index to Vol. XLIII

THE time has arrived for another edition of the volume index of AUTOMOTIVE INDUSTRIES. The current index will be the third that we have issued separately from the regular copy of the magazine. We are quite glad to supply this index to any subscriber who may feel the need of it and only your name and address is needed to bring it to you. We have preserved the list of those who requested the Vol. XLII index in July and to this list we will send the Vol. XLIII index as soon as it can be printed, which we hope will be early in January. Printing conditions are better than in case of the two recent issues of this index and we hope to serve you more promptly. Even if you received the last index, it will do no harm to send in your name again as a check on the list we have prepared.

THERE is on the editorial desk this year a higher stack of Christmas cards and greetings than ever before. We see in this an indication of more sentiment in business; a more general desire to meet with business acquaintances in good fellowship. These cards are in excellent taste and the sentiment is wholesome. AUTOMOTIVE INDUSTRIES' staff has enjoyed receiving these greetings. We believe that business is better for this annual injection of sentiment. May it increase.

Our greetings to you are for a happy and prosperous 1921.

1920 Production Totals 2,230,000

250,000 Gain Shown Over Former Record

Ford and Chevrolet Alone Reach Goals—Truck Total Reaches 348,000

DETROIT, Dec. 28—Production of passenger cars and trucks reached 2,230,000 in 1920. Records of output for the first eleven months of the year and a careful estimate of December production to the 31st, inclusive, give the aggregate figure. This is a gain of approximately 250,000 over the production of 1919, which totalled 1,974,016. It is somewhere in the neighborhood of 300,000 below the estimated production for this year, as made up from the schedules of those manufacturers who drew up schedules Jan. 1, 1920.

Of the schedules made, only two were lived up to, those of Ford and Chevrolet. Ford started out to make a million cars, and will have approximately 1,023,552 to its credit when the year ends. This figure includes 153,532 trucks. Chevrolet fixed its 1920 production at 120,000 and made 126,172 cars. All other manufacturers, who curtailed production when the readjustment period began, or soon afterwards, failed to make their schedules, and some fell far below.

Motor truck production for the year was 348,000, leaving 1,882,000 as the passenger car production. Ford made a little more than half the cars and almost one-half the trucks. Ford plans to build a million and a quarter cars and trucks in 1921, of which 85 per cent will be cars.

Manufacturers have been striving for several weeks to get their plants in a state of flexibility to operate either under an increased demand, even a sudden one, or at low ebb.

Inventory Shrinkage Cuts Firestone Profit

AKRON, Dec. 27—Analysis of the annual statement of the Firestone Tire & Rubber Co., issued at the last meeting of the stockholders, shows that while the earnings of the company for the year, after allowance for depreciation and bad accounts totaled $9,396,912, the net profits were only $1,245,162, after setting aside $8,151,749 for depreciation of inventory. The gross sales for the year were $114,980,969 as compared with $91,078,513 for the preceding year. Payment of dividends on both preferred and common stock was made possible by the company's surplus of $33,880,757. The surplus is subject to provision for Federal income and profit taxes. The company is in a strong cash position with $5,198,059.

DETROIT ESTIMATES FALL 538,951 SHORT

For the Detroit manufacturing district, AUTOMOTIVE INDUSTRIES has obtained a comparison of the estimated and actual production for 1920, as follows:

Car	1920 Production	1920 Estimate
Briscoe	6,065	30,000
Buick	111,255	200,000
Cadillac	20,549	25,000
Chalmers	9,772	15,000
Chevrolet	126,172	120,000
Columbia	4,806	8,000
Dodge	141,256	200,000
Dort	23,853	30,000
Essex	26,002	40,000
A-Ford	1,023,552	1,000,000
Handley-Knight	115	
Hudson	21,357	30,000
Hupp	19,220	24,000
Jackson	1,347	6,500
King	2,081	10,500
Liberty	4,414	15,000
Lincoln	285	6,000
Lorraine	300	4,000
Maxwell	34,168	80,000
Nelson	615	4,000
Oakland	36,264	100,000
Oldsmobile	25,786	80,000
Overland	97,446	200,000
Packard	6,040	10,000
Paige	16,722	30,000
Patterson	1,071	3,000
Reo	14,839	22,000
Roamer	1,657	4,000
Saxon	739	10,000
Scripps-Booth	9,288	20,000
X-Studebaker	45,200	80,000
Willys-Knight	15,813	80,000
Total	1,848,049	2,487,000

A—This includes cars and trucks. Of the total 153,532 were trucks.

X—Figures shown here are the production in Detroit only.

DYNETO AUGMENTS FORCE

SYRACUSE, N. Y., Dec. 27—The Dyneto Electric Corp. is taking on more workers because of an increase in orders and the affairs of the company, which are in the hands of a creditor's committee, are rapidly being adjusted.

The New Process Gear Corp. which is a subsidiary of the Willys Corp. has been closed for several days but will reopen after the first of the year on a very limited operation basis.

PREST-O-LITE CUTS PRICE

INDIANAPOLIS, Dec. 27—Prest-O-Lite Co., Inc., has reorganized its factory upon a pre-war basis enabling it to effect economies which will result in a reduction of 20 per cent in the price to consumers on batteries.

Franklin to Raise Price in January

Advance of $100 Planned on All Models—Price Now Not Profitable

SYRACUSE, Dec. 24—The recent cut in prices on all Franklin models was only temporary, according to developments indicated here to-day when H. H. Franklin, president of the Franklin Automobile Co., admitted that there would be a price increase early in January. It was first intimated the increase on all models would be $150, but Franklin announced that the new price would be only $100 in advance of the schedule which followed the sweeping price changes of a few months ago. It was reported the Franklin company could not produce its cars at the lowered price profitably.

As soon as the lowered price was announced the sales of the Franklin cars immediately increased until the schedule of deliveries a week showed 229 cars shipped in seven days. The production is now progressing at the rate of 33 cars per day and more than 3000 hands are being employed. The renewed activity at the Franklin is reflected in the various other plants in the city.

May Need Legislation to Dump Army Trucks

WASHINGTON, D. C., Dec. 27—Inquiries at the War Department relative to the proposal of Representative Anthony of Kansas to dump on the market many thousands of motor vehicles now owned by the army discloses that 34,000 trucks now are owned by the Transportation Division. Approximately 10,000 of this number are not serviceable. They are used in Motor Transport schools and to supply parts. Under the present law if the army has a surplus of motor equipment, it must be transferred to other departments of the Government. It is believed the law must be amended or a new legislation enacted to permit the proposed dumping. The War Department contends that it needs all the motor vehicle equipment now on hand. If there is an actual surplus, the Postoffice Department and the Bureau of Public Roads would be glad to absorb it although Anthony contends these departments of the Government have all the equipment they need.

It will be possible for the committee on appropriations of the House, of which Anthony is a member, to create a surplus by cutting down appropriations for the military establishment and reducing funds for the transportation section.

Treasury Seeks Car Tax Support

Price Drops Shown to Increase Buying

Senate Gets Data Indicating Gain in November Sales Over Previous Year

WASHINGTON, Dec. 28—Treasury officials are making a determined effort to bring Congressional support to their plans for an additional tax assessment against the automobile industry which is calculated to yield $290,000,000 over and above the present tax returns. Dr. T. S. Adams, chairman of tax advisory committee of the treasury, has produced for the Senate committee on finance, now considering revenue measures, the latest available data showing that the automobile industry had paid into the treasury in November $1,220,000 more than for the corresponding period last year.

According to Dr. Adams, this amount was realized from tax on sales of automobiles, motorcycles and accessories. He made no distinction as to trucks and other items. In this connection, it is significant to note that as chairman of the treasury advisory committee it was Dr. Adams who devised the taxation plans which Secretary Houston forwarded as his suggestions for tax revision. The chairman, it is said, took the automobile taxes as an illustration of the advisability of adopting the treasury proposals as to additional taxes.

While no specific reference was made to the automotive industry by Dr. Adams in his contention that price drops have stimulated retail trade more than is realized, he stated that the income from so called luxuries and non-essentials had increased with the exception of cigarettes. Last year cigarettes yielded the largest revenue. The Treasury Department regards the automobile as a non-essential, for automobiles and gasoline are conspicuous in the list of commodities and articles singled out for additional taxes on sales.

All Taxes Not Recommended

Secretary Houston informed the Senate committee that "obviously all these taxes are not recommended. They are mentioned as possible new sources for which to make a selection." Within a few minutes after the secretary had sought to bring out the distinction in regard to additional taxes, his chief advisor, Dr. Adams advised the committee that there were surprising increases in revenues for November from so-called luxuries. His statistic 1 exhibit for November 1920 cited the gain in automobile taxes as against an unaccountable decrease in returns on cigarettes.

Secretary Houston recommended that the Senate retain "A simple system of specific sales or consumption taxes designed to collect a moderate proportion of the aggregate tax levy from a few highly productive taxes on non-essentials. Miscellaneous sales or excise taxes shifted in main to the consumer supplied in the last fiscal year about 20 per cent of the total taxes, or about 25 per cent if customs duties are counted as consumption taxes."

Revere Creditors Allege Bankruptcy

INDIANAPOLIS, Dec. 24—A creditors petition asking that the Revere Motor Corp. of Logansport, Ind., be declared bankrupt has been filed in the United States District Court here by the Gibbs Service Co., the LaSalle Steel Co., and the Steel Sales Corp., all of Chicago. The petitioners list claims amounting to $2,800 and allege that the liabilities of the Revere Co. are $150,000 in excess of its assets. The petition sets the total liabilities of the company at approximately $450,000.

The Revere company was incorporated in Delaware in 1917. Its product is a high grade car equipped with a 4-cylinder Duesenberg motor. Its plant has a capacity of ten cars a day. The authorized capital is $3,500,000, of which $1,580,000 is outstanding. There is no funded debt. The stock was first offered to the public in January of this year at $12.50 a share. Gross earnings for the year ended Dec. 31, 1919, were $279,087.

ADAPT TRUCKS FOR TRAILERS

NEW YORK, Dec. 27—The Trailer Manufacturers Association of America announces that new truck models for 1921 to be put out by several manufacturers will embody changes which will adapt the trucks for drawing trailers. These include additional speed changes, heavier rear end construction, coupling devices and increased braking surfaces. The Association strongly urges truck manufacturers to adopt standardized trailer hitches as regular equipment so that any make of trailer can be used with any make of truck.

MEXICAN AIR MAIL LIKELY

WASHINGTON, Dec. 27—A demonstration flight by a Mexican aviator in an American airplane between Mexico City and Vera Cruz, a distance of 225 miles, to demonstrate the feasibility of an aerial mail service was so successful that the Mexican government probably will establish an air mail line between Mexico City, Puebla and Vera Cruz in February or March.

Milwaukee Banks Find Pressure Past

Manufacturing Still Further Curtailed—Prices Continue Trend Toward Final Basis

MILWAUKEE, Dec. 27—Outstanding features of the present situation in Milwaukee industry and commerce are given as follows in the current edition of *Business and Financial Comment*, issued monthly by the First Wisconsin National, the largest bank in Milwaukee:

"Liquidation continues, though not at so rapid a rate; efforts to stabilize prices not successful.

"Banks have passed period of greatest pressure.

"Prices falling in a scattered way; basis of adjustment not yet reached.

"Business of Milwaukee industries still further curtailed; plants running on shorter hours; unemployment growing, but wages not reduced.

"Efforts being made to deal with cancellation evil.

"Practice of price guaranteeing protested."

In regard to the local industrial situation, it says: "Milwaukee industries have slowed up still more during the last month. Plant operations have been curtailed anywhere from 75 to 80 per cent in the automotive and allied lines to 10 or 20 per cent in iron, steel and heavy machinery. Forward business shows a decline from last month, and is 40 per cent below last year. Among the light metal trades and automotive lines the falling off is fairly uniform.

"Business prospects are variously regarded by Milwaukee manufacturers. A decided improvement is looked for after the first of the year. In the automotive parts industry some optimism is manifested. A manufacturer of motor trucks says that activity in certain localities is already apparent."

Maxwell Suit to Test Validity of Contracts

DETROIT, Dec. 24—The Toledo Bridge & Crane Co. filed suit in Toledo this week against the Maxwell Motor Co. for $34,901.79 alleged due on a contract for the manufacture of 40,000 oil pans at $2.50 each. The plaintiff alleges after he purchased the necessary equipment and material the contract was cancelled by the Maxwell company.

Automotive manufacturers attach wide interest in the proceeding on account of the situation as regards the validity of contracts and the right to cancel, and will follow the litigation closely.

Cleveland Plants Enlarge Schedules

Will Accumulate Gradual Surplus in Anticipation of Spring Increased Demand

CLEVELAND, Dec. 27—The New Year will find the older and larger automobile makers in this city going along smoothly and drawing on reserve funds in some cases, with working forces reduced but nothing serious ahead. The younger and smaller companies have had a more severe time, but there has not been a single failure in Cleveland's colony of automobile makers. The younger and smaller companies have in some instances had to resort to special financing, such as issuing short term notes, and suspending payment of bills for a definite period of thirty to sixty days, giving interest on outstanding accounts, however, but there is not a single maker, who would not be back to the old solid foundation in sixty days of normal business.

The Winton, which has been practically closed for about two weeks, will reopen Jan. 15, with nearly a normal force of men, and a canvass indicates that practically all Cleveland automobile makers will go into increased production in January—and by this is meant a production greater than has been the case in the last month or six weeks.

Out at the Jordan plant they are producing on the theory that there will be a demand—larger than ordinarily—in the spring. Jordan will not be caught napping, is the theory that prompted the management to put on more men than the flow of orders at present would warrant, and Jordan has not been complaining about business.

The White Motor Co. is not working nights, but the entire force of 6,500 has been retained on day work, and they are all sure of their jobs through the winter. They're turning out more work per man than they have for some time. The White company is confident that there will be an accumulated demand for trucks next spring, and they are preparing for it.

Chandler-Cleveland Pick Up

Chandler and the Cleveland Automobile Co. slowed down late in the last month of the old year, but they are going to stimulate production in January. The increase is to take care of current orders and the expected demand in the Spring. Both concerns report that there have been many inquiries for spring from wholesalers and jobbers.

Peerless, in line with others, slowed down production but now is operating on a larger basis. The number of employees is to be gradually increased throughout the winter months.

Templar, which some time ago got a clean bill of health from Judge Levine in Common Pleas Court, has gradually been increasing its force of employees, and although the number is still far short of the operatives on the job early in 1919, yet the number of cars turned out daily is sufficient to keep finances in healthy condition.

At the Grant plant, General Manager Hubbs declared that he sold more cars in December than he did in the previous two months and that with the proceeds of the notes recently taken up by stockholders he has no fear for the future. He has increased the force of workmen in the last month; orders are coming in a manner that indicates 1921 will be a good year.

Creditors Request Cotta Receivership

ROCKFORD, ILL., Dec. 27—Alleging that the Cotta Transmission Co., organized to manufacture parts for motor vehicles, had committed acts of bankruptcy by paying out certain sums of money while insolvent, creditors of the company have filed an involuntary petition in bankruptcy against the concern in the United States Federal Court. The petitioners include the La Salle Steel Co. and the Spring City Foundry Co., both of Chicago, and the Werra Aluminum Foundry Co., Waukesha, Wis.

It was alleged that on Aug. 28, 1920, E. P. Reber, an officer of the company, was paid $23,297 "with intent to prefer said E. P. Reber as a creditor; and on Aug. 24, 1920, to have paid $33,526 to the McJunkin Advertising Co. with intent to prefer said McJunkin Advertising Co. as a creditor." The claims of the petitioning trio are as follows: Spring City Foundry, $41,197; La Salle Steel, $40,269; Werra Aluminum, $33,516. The petitioners ask for the appointment of a receiver and suggest the Central Trust Co.

Liabilities are alleged to be $700,000 and the assets approximately $1,080,000.

TO VOTE ON SHAW SEGREGATION

CHICAGO, Dec. 24—Action by the stockholders will be taken at a meeting in New York on Jan. 28 on the proposed plan of segregating the taxi livery and manufacturing branches of the Walden W. Shaw Corp. Stockholders of record Dec. 31 will be the only ones entitled to vote. Under the plan the present $675,000 stock of the Yellow Cab Mfg. Co. will be designated Class "A" stocks, and there will be issued 50,000 shares of Class "B" stock of $10 par value for which Shaw stockholders of record Feb. 10 may subscribe at par in the ratio of one share for each four shares of Shaw stock held. Warrants for the new stock will be issued about Feb. 20.

PUMP BUSINESS EXCELLENT

FORT WAYNE, IND., Dec. 27—The plants of S. F. Bowser & Co., Inc., and the Tokheim Pump Co., both manufacturers of gasoline storage systems and self-measuring pumps, were closed during the week of Dec. 27 for inventory. The three pump companies here report excellent business for the year up to the past few months. The city's new pump company, the Visible, is getting ready to begin extensive operations.

Inventories Close Plants for Holidays

General Resumption Looked for Soon After January 3 in Detroit District

DETROIT, Dec. 27—Most of the Detroit automobile plants are shut down for the holidays and in nearly all of them the gates will remain practically closed until after New Year's Day for inventory taking. In some the resumption of production will be postponed until later in January, the Studebaker plant, for instance, announcing the starting of operations for 1921, Jan. 10. It was planned originally to keep the Studebaker plant closed until Jan. 17, but President Erskine last week issued a statement that the improved business outlook had prompted the decision to reopen one week sooner in all of the company's plants.

Ford practically went down Thursday, though the official order called for a shutdown Friday until Jan. 3. Packard closed Friday for inventory and probably will resume Jan. 3, though no definite date has been announced. Paige, which has been on a four-day weekly schedule, did not close down entirely for the holidays, some of the departments resuming operation to-day. Production of finished cars for the next week, however, practically has ceased. Hudson and Essex plants will devote most of the holidays to inventory and no announcement has been made when the plants again will be in production. The Essex plant has been closed for some time, but cars of both types have been put out in the Hudson plant.

Cadillac went down Thursday and will remain closed until after New Year's Day, but Hupp officials announce that the plant will work right through the month stopping only for the Christmas holiday. Those departments of Dodge Bros. which have been operating on a curtailed schedule will close down Friday night and will resume Jan. 3. Columbia, Liberty, Scripps and Saxon are down throughout holiday week, as is the Maxwell plant where a few cars have been built while reorganization efforts in behalf of Maxwell-Chalmers have been proceeding in New York.

All of the plants outside of Detroit are closed during the holidays, including Reo, Oakland, Olds, Buick, Chevrolet, Briscoe, Jackson and Barley.

DETROIT GARAGES CUT WAGES

DETROIT, Dec. 24—While there has been no action looking to the reduction of wages in the manufacturing plants, automobile dealers in Detroit in nearly all instances have reduced wages in the garage from 15 to 25 per cent. Fear that a cut would prompt an exodus of employees has been dissipated and inquiry among many of the dealers elicited the information that not a man had failed to report.

Capital Is Assured For King Operation

Arrangements Made for Concentration of Operations—To Develop Service Department

DETROIT, Dec. 27—Charles A. Finnegan, head of the Buffalo syndicate which purchased the assets of the King Motor Car Co., announces that adequate working capital will be provided to develop the business. A long term lease has been taken on a new factory building recently completed by the Swedish Crucible Steel Co. and manufacturing activities will be concentrated under one roof instead of in three separate buildings as heretofore. Finnegan's associates are A. Weber, who will be president and general manager of the company, and Eugene Hofeller. The assets of the company were purchased for $500,000 but the syndicate made substantial payments to principal creditors in buying up the claims. The largest was to Artemas Ward, Sr., he was paid 40c on the dollar for the notes he held which totaled nearly $500,000. Production will start Feb. 1.

The King Motor Car Co. will continue to manufacture its own motors and transmissions and will do its own painting and trimming. Production will be continued on the two, four and seven passenger touring models as well as the six passenger enclosed car. No change will be made in the name of the products nor in the prices. Preparations are being made to extend the facilities of the service department so that King owners will be insured prompt and reasonable parts replacement service.

S. J. Feldman of New York has been placed in charge of eastern and export business. H. C. Bradfield, who was advertising manager of the company for several years, will act as advertising counsel.

Finnegan now is operating six automobile plants in different parts of the country including the Giant Truck Corp. formerly owned by the Chicago Pneumatic Tool Co. and the parts order business of the E. R. Thomas Motor Car Co.

FORD DROPS CANADA PRICE

DETROIT, Dec. 27—The Ford Motor Co. of Canada has announced new prices as a result of the removal of the Canadian luxury tax. Touring cars which formerly were $883.71 are reduced $95.92. The price of the roadster has been cut $87.86; the coupe $136.14 and the sedan $148.50.

ATLAS FORGE BUSINESS GOOD

LANSING, MICH., Dec. 24—Atlas Drop Forge Co., the last of the forging plants to close, shut down this week in order to take the annual inventory and to overhaul the machinery and plant generally. The company, according to Secretary S. H. Carpenter, has more than $250,000 worth of orders in prospect, and he declares on this basis the plant will be able to go ahead with the full force as soon as work on the readjusting of the plant and machinery and the taking of inventory is completed.

Carpenter said the noticeable improvement in the industry indicated that by the time present orders are filled the conditions will be so adjusted as to warrant the granting of further orders by automobile plants.

Studebaker Cuts Down Time for Inventory

SOUTH BEND, IND., Dec. 27—The Studebaker Corp. has reduced its inventory taking period, which began Dec. 23, by one week and will re-open all departments Jan. 10. It had been planned to remain closed until Jan. 17. An announcement by the company to their employees says:—

"The Studebaker Corporation is mindful of the fact that the reduction in working hours due to the slowing down of its business has not only resulted in a reduction of its earnings but has also resulted in a loss to its employees. It is anxious to do everything in its power to make the loss to its men as light as possible.

"It is felt that the present period of dull business is nearing an end, and that before very long we will be running at full capacity. We hope that every employee will do his part to hasten his time by loyal and efficient work."

The order applies to all plants, both in Detroit and in other cities.

Fort Wayne to Sell Tires at Half Price

FORT WAYNE, IND., Dec. 27—Following the recent litigation in which the Fort Wayne Tire and Rubber Co. has been engaged the following advertisement has appeared in the local newspapers:

"The entire stock of finished tires and tubes of the Fort Wayne Tire and Rubber Co. will be sold at a 50 per cent reduction. These tires are all new and of the very best workmanship, are all firsts and carry a 6,000 mile guarantee. To those who expect to purchase new tires now or in the spring we would advise buying now and make this big saving. This sale will be conducted on a cash and carry basis. None will be laid by for future acceptance."

BURGESS BATTERY RESUMES

MADISON, WIS., Dec. 27—The Burgess Battery Co. of Madison, Wis., has resumed production with a full force of 250 operatives after a recess of about three weeks which was effected to permit of a readjustment. Part of the force was kept employed throughout the period, and those laid off have been reemployed at the former wage schedules. Surplus stocks have been worked off and new orders have been booked to keep the plant busy.

See Parts Shortage When Trade Resumes

Truck Manufacturers' Association Secretary Would Encourage Preliminary Production

CHICAGO, Dec. 27—The annual meeting of the board of directors and the members of the Motor Truck Manufacturers' Association have been called for the third Tuesday in January, and so many questions of importance will come up for discussion that the present plans are to continue the meeting over two days.

The return to normal business in the industry depends almost entirely on the condition of general business throughout the country, in the opinion of David Thomas, general manager of the association. So soon as there is a resumption of buying of the ordinary commodities, the merchandisers will feel the need of acquiring greater transportation facilities to move their goods.

In this connection, in a bulletin sent out to-day, he directs attention to a situation which he holds will face the truck makers when business returns to normal.

"It is surely fair to assume that whenever business generally comes back to normal," he says, "the demand for replacement trucks will be immediate, and accompanying this demand will be demands from new sources. I believe that it is going to be demonstrated that the average motor truck manufacturer's inventory is not sufficient to keep him in normal production for two weeks.

"As business resumes, the manufacturer of motor trucks will feel its effect first, and afterward the manufacturer of parts and units. If this resumption is to be immediate, the manufacturer of motor trucks, generally speaking, is going to lose a lot of business, because the unit and parts manufacturer will be flooded with demands for their product far beyond their ability to produce. Unless the parts and unit manufacturer can be reasonably warranted to begin production in anticipation of the great volume of business that is coming, whether it comes in January or six or seven months hence, we are going to experience a great scarcity of motor trucks."

SLOCUM CREDITORS TO ACT

NEWARK, N. J., Dec. 27—Creditors and stockholders of the Slocum, Avram & Slocum Laboratories have been directed to show cause on Jan. 3 why the receivers for the company should not turn over to the Machinery Output and Time Recorder Co., all equipment used in the manufacture and sale of a device known as the "Productograph." Under this proposal, the Machinery Output Co. has agreed to cancel its claim for royalties and will assume all obligations incurred by the laboratories in the manufacture of the "productograph."

Insurance Changes Injure Car Sales

Policy Restriction to 80 Per Cent of List Price Creates Buying Unrest

MILWAUKEE, Dec. 27—Two phases of insurance protection as it affects the automobile business are receiving attention among Milwaukee manufacturers of parts and accessories, state representatives and retail dealers. The subjects are of chief concern to the credit and financial men of these businesses. Laxity regarding insurance during the "big days" in the business in 1920 and 1919, are said to be basically responsible for certain pressure now resting on the credit men.

Anxiety on the part of insurance companies, and pressure exerted by them upon their local agents, as to the kinds and amounts of risks are seriously hampering sales of cars, new and used, under conditions which are described by automobile men as being "already too tough."

With the installation on Jan. 1 of a merit system of rating cars for insurance purposes, still further "rocks are strewn into the paths of the automobile salesman," according to dealers and state agents.

Insurance companies here report that there is so much opposition from their agents, especially in the larger cities, to instructions to cut down policies on cars, that there are likely to be a great many changes in representation of insurance companies throughout the spring months. Some agents are refusing to insure cars for more than 80 per cent of their list prices, and these and other phases of insurance work at this time are all said to be disconcerting to purchasers and salesmen, and a marked hindrance in the endeavors to bring sales back to normal.

Buyers Resent Examination

One dealer states that insurance agents cross-examined several recent purchasers of new cars, affecting to believe that the sales were made at less than list prices, with purchasers securing receipts for the list price in full. "While the intimation of such a canvass is farthest from the truth in my case at least," said this dealer, "it invariably raises a question in the purchaser's mind as to what is really 'bottom price' and 'did I foolishly get stung by paying the list price—are others getting out prices?'

From insurance circles come numerous stories which are printed in the daily press, that "automobile insurance business is being watched closely just now, and that there is a great feeling of uncertainty on the part of companies that sales have suffered a serious set back and that lower prices will prevail." Increasing moral hazards are constantly referred to. A western insurance publication recently printed an article saying that "the danger lies principally with those owning large numbers of cars rather than with individual owners. The dealer seems to be hit harder than anyone else. Companies having written dealers' business rather liberally are plainly worried."

Another publication printed the following, which has gained considerable circulation in Wisconsin: "One purchaser stated that not only had he received a reduction from list price amounting to about 15 per cent, but he had also received a guarantee that if the price of the car was reduced by July 1, 1921, he would receive a refund equal to the reduction. He got a receipt for the full list price of the car. The opportunity which these selling methods give to the unscrupulous purchaser to sell out to the insurance companies is obvious."

Part Payment Sales a Factor

Another "column" stated "that thousands of cars that were being purchased through financing companies on the partial payment plan have been turned back to the dealers because of the inability of the purchaser to carry the contract to completion. The financing companies are not losing anything. They are protected by their insurance policies and the dealer's endorsement of their paper."

With these burdens placed on dealers, the insurance companies are frankly assuming the attitude that the new business can be written intelligently enough, but the companies are worried about the liability already on the books. Dealers claim that this position is actually resulting in cars being turned back, as the purchasers have become worried about the transaction and prefer to let go.

Fire and theft policies under the new Western rating system show a decrease of about 16 per cent in rates, except in large cities. Mutual and reciprocal competition is said to be furthering still more reductions at an early date.

The new system provides for a uniform fire schedule for all localities. The theft rate varies with the locality, according to the extent of thefts in the past. Rates will vary according to the age of the car, fire rates increasing and theft decreasing with age. The 15 per cent lock and fire extinguisher credits are still allowed. An enclosed car with a lock will enjoy the locking device credit. The most marked part of the change is in making a distinction between country and city cars. Insurance men state that a similar merit system did not prove satisfactory in the East, but a country schedule was never effected there. For example, rate books show that the same theft rate was collected in Reading, Pa., as in New York City. On Jan. 1 a country schedule became effective throughout the East. Here also the theft, as well as fire rates, will be changed according to "experience".

Plan Educational Campaign

On the other side, the credit and financial men of Milwaukee automobile interests are about to assist in launching an educational campaign among dealers and "consumers," the need for this being shown since the price recession and general change in the business situation.

Traffic to Resume; Uncertainty Ended

Intensive Selling and Advertising Campaigns Necessary for Future Business

ST. LOUIS, Dec. 24—The Traffic Motor Truck Corp., manufacturers of the Traffic truck, will resume operations on Jan. 3 with a view to running the plant on a full production schedule, according to President Guy Wilson. The plant has been closed for the last four months and in normal times employs approximately 1500 persons.

"The reasons we decided it was time to resume production," Wilson says, "are based on a very painstaking study of the general situation. The period of uncertainty through which we have passed seems to have run its course. The atmosphere is clearer and we are better able to see where we are going.

"It is going to be necessary for every manufacturer to conduct his business more intensively. The heyday when buyers flocked in is a thing of the past. Manufacturers will have to begin intensive selling and advertising campaigns and, in general, conduct their business on a much more intensive plane than ever before. It will require salesmanship and product of the highest kind to conduct any large business this year.

"To get the benefit of the present reduction of prices it will be necessary to produce more in order that the supply may be kept commensurate with the demand. If the supply is not kept up with the increasing demand, a reversal to higher prices will be the inevitable result.

"On the whole, I am extremely optimistic over the outlook for next year, and our firm is giving proof positive of its belief in the general soundness of things by adopting the policy of reopening for capacity business."

DIRECTORS GUARANTEE TRUCKS

INDIANAPOLIS, Dec. 27—The Stutz Fire Engine Co. states that it has not given bond to this city to make all repairs and replacements for ten years on twenty-five pumpers and ten service trucks recently purchased, as announced a fortnight ago. Several directors of the company, however, have given bond guaranteeing parts and replacements for that period. This is not designed as a guarantee against breakage or damage incurred by the machines.

VESTA CUTS BATTERY PRICE

CHICAGO, Dec. 27—Vesta Accumulator Co., manufacturer of the Vesta battery, has reduced prices 17 per cent on batteries of six volts and 15 per cent on batteries of twelve volts and over. The Vesta company at the time price increases were made by other manufacturers in May did not join in this action, although a slight increase had been made in the month preceding.

War Possibilities of Cars Summarized

Would Standardize Parts for Army Vehicles—Military Road Building Studied

WASHINGTON, Dec. 27—Inauguration of a campaign to encourage the more extensive use of chassis and automobile parts with relation to problems of defense, is recommended by the Council of National Defense in its annual report to Congress. The inventory of the automotive resources of the country conducted by the council during the past year was helpful, but so unsatisfactory in its lack of detail that a more complete inventory is contemplated.

As to the standardization of parts, the council believes that the plan discussed at a meeting of the Interdepartmental Defense Board could be inaugurated without difficulty. The Board considered standardization of parts for Army vehicles, so that there might be in actual operation and in stock more equipment of this sort, which was according to specification. The report says:

"If such a campaign were successful there would also be in actual productive operation more machinery which could be used for the production of automotive equipment such as fitted the specifications of the War Department."

The problem of the motor truck and the highways in time of hostilities was studied by the council. The report stated that "the two important studies in road construction which were inaugurated during the past year will doubtless develop into serious and significant proportions in the very near future. The one is a study of the type of road which will stand the strain of motor transportation such as is very likely to be concentrated on roads in time of war and, if possible, without repair for a period of several years. The second study related to the location of roads, particularly roads of the type referred to in the first study, in such a way as to form a defense system. These roads should be planned so as to aid in military mobilization; in industrial mobilization to relieve the strain of railroad transportation at the points of greatest congestion, in so far as this is possible; and to supplement the railroad systems in such a way as to make immediately available those resources of the country which are not easily reached by railroad facilities."

Truck Key to Distribution

The council points out its endeavor to find means of increasing and reordering production in accordance with the changing requirements of perturbed times. The motor truck holds the key to emergency economies in distribution, for the council has always based its calculations on the distribution of essential commodities by trucks and railroads.

During the recent war many experiments were undertaken aiming to reduce the man power and capital occupied in the handling and delivering of goods to consumers or users. It is proposed to summarize the results of such war-time experiments and to estimate the economies effected or which might be effected by resorting to such devices as were tried.

In this direction also effort has been made to assemble information as to proved general plans and well-studied systems of handling in the most economical manner the typical problems of distribution and delivery.

Vocational Training Urged

It is significant to note, because of the conversion of certain automobile plants into airplane factories in war times, that the Council of National Defense urges that there should be planned studies of the adaptability of labor, and of the ways and means in which, by special vocational training, certain technical information can be quickly and effectively imparted so as to make men available for those processes of war production which are somewhat different from ordinary production, and which demand considerable numbers of men immediately upon the entry of the Nation into war. Such studies would also include an analysis of special efficiency methods adapted to the labor conditions arising in times of war and in particular to those special problems of personnel management which arise in such times.

OVER MILLION HORSES ON IOWA FARMS

DAVENPORT, IOWA, Dec. 27—On 208,120 farms in this State there are 169,551 automobiles, 17,603 tractors and 8701 motor trucks, according to statistics gathered by the State Department of Agriculture, to be included in a forthcoming year book. The report will also show that there are 1,270,888 horses and 74,106 mules on Iowa farms.

To Study Legislation on Vehicle Bills

NEW YORK, Dec. 27—The Motor Vehicle Conference Committee has made plans to collect prompt, complete and accurate information regarding the introduction and progress of motor vehicle bills in both the Federal and State Legislatures which hold sessions next year.

In addition the conference committee is completing the organization of subcommittees in each of the forty-eight States. Facts and arguments will be laid before the State legislatures to guide them in the enacting of motor vehicle legislation based upon scientific and equitable principles. It is expected that more than 1,000 motor vehicle bills will be introduced in forty-two states.

Spring Buying Good in Northwest Field

Depressed Period Excels Pre-War Times 50 Per Cent, Pioneer Dealers Find

PORTLAND, ORE., Dec. 27—These are not exactly flush days for the automobile trade in this territory, yet there are a good many encouraging signs both for the present and future. Few cars are being sold for immediate delivery and the used car market is very dull. In this respect there has been little if any improvement since the election. But on the other hand there is quite a trend toward ordering cars for future delivery, either in the spring or summer.

This tendency on the part of buyers has become noticeable enough to occasion quite a little talk. While dealers in their present overstocked condition would much prefer, of course, to sell cars outright and deliver them, the shrewd business men among them see unmistakable signs in this movement of the long-predicted coming revival in the spring.

Even so, November and December in normal times always have been slow months in the automobile business here. It has been so long since what can be called "normal times"—dating back to before the war—have prevailed in the industry, however, that dealers who have entered business since have nothing with which to compare present conditions.

But one of the pioneer automobile distributers in Portland discussing the situation the other day, harked back to before the war and declared that business right now is 50 to 100 per cent better than normal, as compared to then.

"The trouble with a good many dealers," he said, "is that they find difficulty in realizing that we have simply returned to a period when we must sell automobiles, instead of waiting for people to come in and buy them faster than we can fill orders. That has been the case for the past several years, almost from the time the European war began. Times in this period, which has just closed, were abnormal. We had no right to expect that they would continue.

"November and December always have been the worst months in the year for selling automobiles in this territory. Recently I went back to what I call 'normal' times before the war. I found that, regarded from that basis, we are actually right now doing a 50 to 100 per cent better business than we did then. I don't see any cause to worry. True, we will have to sell cars. But we did it then and we can do it now and in future."

TIRES CUT 15 PER CENT

ANDERSON, IND., Dec. 27—The Charles E. Miller Rubber Works has marked down prices on cord tires 15 per cent. The reduction also includes tire molds, tire cores, vulcanizing equipment for tire and rubber repairshops, rubber workers' tools and other products.

Exports of Automobiles and Tires for October

COUNTRIES	Automobiles								Parts	Tires			All other tires
	—Commercial—				—Passenger—								
	Complete Cars		Chassis		Complete Cars		Chassis			Casings	Inner tubes	Solid tires	
	Number	Dollars	Number	Dollars	Number	Dollars	Number	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars
Europe													
Austria	...	.....	...	.....	....	.....	...	.....	.....	20,566	1,708	.....	.....
Azores and Madeira Islands	...	.....	...	.....	...	.....	...	.....	.....	60	.....	180	.....
Belgium	10	5,280	...	.....	247	286,492	...	.....	23,172	132,011	16,521	.....	.....
Bulgaria	...	.....	...	.....	...	.....	...	.....	17	400	142	.....	.....
Denmark	...	.....	4	5,078	89	142,499	...	.....	363,587	20,216	796	4,200	.....
Finland	...	.....	10	23,181	1	1,741	...	.....	730	5,620	1,800	.....	.....
France	...	.....	...	.....	78	75,615	...	.....	247,531	31,468	708	.....	.....
Germany	...	.....	5	13,981	6	10,700	...	.....	65	4,920	1,152	.....	18
Gibraltar	1	495	1	900	11	17,724	1	900	180	1,016	128	.....	.....
Greece	5	1,647	...	.....	68	123,073	3	1,858	13,175	40,707	11,038	.....	.....
Italy	...	.....	28	61,650	26	35,119	4	10,619	13,050	147,621	10,808	346	.....
Malta, Gozo, and Cyprus Islands	...	.....	...	.....	2	2,000	...	.....	745	1,500	.....	.....	.....
Netherlands	92	65,333	50	47,875	495	585,792	4	13,136	42,364	178,700	59,098	.....	937
Norway	33	51,714	7	13,057	123	195,772	5	7,488	48,064	45,463	8,054	27,404	2,343
Poland and Danzig	4	3,000	...	.....	8	10,442	...	.....	.....	4,800	.....	.....	.....
Portugal	10	23,507	1	5,583	48	78,864	...	.....	11,596	30,050	73	95	.....
Roumania	3	4,361	...	.....	17	17,525	...	.....	2,014	30,209	336	.....	.....
Russia in Europe	...	.....	53	28,885	16	8,390	13	7,197	7,906	516	71	.....	.....
Spain	17	45,842	19	43,613	655	1,061,402	7	12,950	772,536	142,571	14,426	880	59
Sweden	13	20,250	18	26,500	249	364,132	9	10,004	64,939	2,499	633	300	3,896
Switzerland	...	.....	...	.....	179	303,563	3	10,395	5,388	10,721	2,122	.....	.....
Turkey in Europe	17	28,306	...	.....	134	138,805	2	5,130	10,039	288	50	.....	.....
England	194	183,085	82	134,490	839	1,039,670	147	160,999	1,475,665	338,435	19,476	.....	1,836
Scotland	...	.....	...	.....	24	14,826	...	.....	1,883	3,511	.....	.....	.....
Ireland	...	.....	...	.....	9	5,100	...	.....	88	127	.....	.....	.....
Yugoslavia, Albania, etc.	...	.....	...	.....	...	.....	...	.....	.....	1,500	1,509	.....	.....
North and South America													
Bermuda	...	.....	...	.....	...	.....	...	.....	.....	.....	.....	.....	287
British Honduras	...	.....	...	.....	...	.....	...	.....	1,619	837	247	.....	.....
Canada	49	94,350	27	51,839	227	320,150	2	1,418	1,335,600	165,951	28,268	6,327	202
Costa Rica	...	.....	...	.....	7	6,546	...	.....	1,553	610	37	542	24
Guatemala	...	.....	...	.....	23	37,948	...	.....	4,646	2,263	2,147	59	653
Honduras	...	.....	...	.....	5	6,915	...	.....	6,149	513	55	254	.....
Nicaragua	...	.....	...	.....	4	5,200	...	.....	10,585	4,831	277	482	.....
Panama	3	1,485	...	.....	12	14,196	...	.....	9,171	18,004	3,568	10,491	8,328
Salvador	2	990	6	11,129	17	27,835	...	.....	4,387	4,991	1,185	352	342
Mexico	114	188,435	9	31,178	409	335,186	1	3,269	109,899	167,350	23,392	10,317	2,182
Newfoundland and Labrador	...	.....	...	.....	5	11,701	...	.....	1,992	575	.....	.....	879
Barbados	10	4,950	...	.....	15	9,726	...	.....	2,241	3,847	606	.....	.....
Jamaica	22	35,163	6	22,154	34	39,745	...	.....	17,237	34,413	2,764	5,274	269
Trinidad and Tobago	5	6,353	4	9,450	40	42,893	2	3,102	11,541	10,256	4,323	720	.....
Other British West Indies	8	7,989	5	2,681	16	16,794	...	.....	6,590	25,848	2,628	296	513
Cuba	126	332,264	89	238,201	762	1,073,049	10	24,181	236,135	491,632	58,781	11,865	14,803
Virgin Islands of U. S.	1	1,029	...	.....	6	4,207	...	.....	4,666	2,300	672	.....	.....
Dutch West Indies	1	495	...	.....	12	10,966	...	.....	1,145	997	136	.....	.....
French West Indies	...	.....	...	.....	18	15,014	...	.....	5,728	3,874	590	2,595	.....
Haiti	...	.....	1	690	11	10,767	...	.....	8,739	8,650	1,761	.....	.....
Dominican Republic	10	8,548	10	8,756	94	66,198	...	.....	40,506	24,740	1,773	2,456	887
Argentina	12	29,613	12	37,158	279	357,103	4	11,104	338,472	196,511	20,865	3,405	4,698
Bolivia	...	.....	...	.....	3	5,500	...	.....	2,326	3,712	189	.....	.....
Brazil	25	26,466	31	87,248	275	504,363	1	1,070	183,715	153,278	17,156	674	9
Chile	5	2,640	2	1,400	13	22,556	...	.....	47,491	43,232	7,981	1,201	1,496
Colombia	28	18,894	15	12,840	78	88,075	5	8,144	13,699	10,847	2,400	2,416	89
Ecuador	6	11,468	...	.....	46	70,544	...	.....	3,495	4,545	1,090	.....	195
British Guiana	...	.....	...	.....	17	10,760	...	.....	5,631	1,257	125	50	.....
Dutch Guiana	...	.....	...	.....	...	.....	...	.....	2,244	144	.....	.....	.....
French Guiana	...	.....	...	.....	1	900	...	.....	.....	75	.....	.....	.....
Peru	217	167,190	5	11,510	269	224,481	...	.....	37,892	20,755	3,570	.....	273
Uruguay	21	13,690	4	11,000	207	279,90?	...	.....	48,202	31,398	7,400	.....	.....
Venezuela	7	11,185	4	4,965	92	104,513	...	.....	29,394	24,998	3,976	249	.....
Asia and Far East													
China	49	73,071	32	58,517	206	346,454	21	21,863	35,127	38,625	1,830	150	134
Kwantung, leased territory	...	.....	...	.....	8	10,508	...	.....	220	.....	.....	.....	.....
Chosen	...	.....	...	.....	...	.....	...	.....	18,901	.....	.....	.....	32
British India	78	182,276	65	122,801	968	1,180,787	...	.....	153,367	118,060	14,036	8,000	.....
Straits Settlements	51	102,786	8	15,057	258	294,982	8	7,185	47,498	27,885	3,364	12,174	.....
Other British East Indies	2	2,778	7	14,297	31	43,208	...	.....	6,892	9,431	682	.....	.....
Dutch East Indies	101	257,529	98	258,916	659	876,783	14	21,775	163,331	83,707	2,010	10,835	3,636
French Indo China	8	9,510	8	4,448	71	84,830	...	.....	2,607	.....	.....	.....	.....
Hongkong	...	.....	2	3,100	12	15,088	...	.....	2,415	1,851	1,184	1,752	.....
Japan	8	14,375	28	35,684	137	216,925	26	35,303	72,003	4,648	168	.....	88
Persia	...	.....	...	.....	37	21,951	...	.....	3,258	2,459	550	.....	.....
Siam	1	4,000	...	.....	10	10,000	...	.....	1,332	.....	.....	.....	157
Turkey in Asia	2	2,681	6	6,741	89	78,487	1	690	9,837	9,957	2,418	.....	.....
Australia	14	34,722	32	53,517	249	352,113	653	701,015	306,610	159,885	15,152	8,780	6,256
New Zealand	5	13,262	3	6,525	314	422,292	11	19,554	90,313	167,951	9,666	15,201	2,531
Other British Oceania	...	.....	...	.....	...	.....	...	.....	476	643	63	.....	.....
French Oceania	...	.....	...	.....	4	4,100	...	.....	1,643	1,115	215	.....	61
Other Oceania	...	.....	1	650	...	.....	...	.....	.....	.....	.....	.....	.....
Philippine Islands	47	70,571	20	42,390	281	325,762	...	.....	75,593	195,255	31,511	11,281	12,554
Africa													
Belgian Kongo	3	2,070	...	.....	...	.....	...	.....	145	.....	.....	.....	.....
British West Africa	50	79,769	49	74,513	128	161,253	3	3,405	37,326	35,922	4,833	434	45
British South Africa	30	57,139	4	9,163	529	581,278	2	3,500	203,302	226,409	20,865	2,816	1,321
British East Africa	...	.....	...	.....	46	55,702	...	.....	6,510	13,564	970	222	.....
Canary Islands	2	5,249	...	.....	21	36,489	...	.....	771	.....	.....	.....	.....
French Africa	8	4,624	11	10,514	...	.....	2	1,150	6,316	503	20	560	.....
Italian Africa	5	11,500	...	.....	...	.....	...	.....	.....	.....	.....	.....	.....
Morocco	7	3,307	...	.....	40	44,865	...	.....	14,189	2,088	.....	.....	.....
Portuguese Africa	4	9,400	...	.....	2	5,780	3	4,743	2,406	644	34	.....	.....
Spanish Africa	...	.....	1	2,118	...	.....	...	.....	132	.....	.....	.....	.....
Egypt	2	4,382	1	1,165	174	173,639	...	.....	7,594	12,488	1,288	1,697	.....
Total	1548	2,351,018	884	1,667,108	10595	13,586,255	967	1,113,147	6,910,538	3,789,819	459,490	167,332	72,033

Goodyear Shows Big Loss for Year

Runs Into Millions; Financing Delayed

Directors Seeking Better Terms Than Those Offered by Syndicate of Bankers

AKRON, Dec. 29.—A deficit of $15,047,653 was shown in the annual report of the Goodyear Tire & Rubber Co. for the fiscal year ending Dec. 31, presented at the directors' meeting here to-day. This does not include anticipated losses of $19,000,000 on contractural obligations for rubber and fabric. The statement shows the sum of $3,568,445 due the company from President F. A. Seiberling. This account has been closed by the company taking over the Good year athletic field and 30 acres of land owned by the East Akron Land Co., and one-half ownership of the Akron, Canton & Youngstown Railway through the deposit by Seiberling of 250 shares of common stock and 75,000 shares of capital stock as collateral.

Bills payable under liabilities include $13,439,423 due on bank loans and $5,995,500 due to brokers. The statement also shows $736,095 due on subscriptions for stock issued to F. A. and C. W. Seiberling.

The directors denied that it was decided to-day to pass the preferred dividend but it is considered a matter of course that it will be. The adjourned stockholders' meeting called for to-day was adjourned again for two weeks and the company was not ready to announce refinancing plans.

It has been learned in the last few days that the company considers the terms of the syndicate of Eastern bankers too exacting and that efforts will be made to raise $50,000,000 without mortgaging the plant or giving control of a majority of the stock. It is understood an ineffectual attempt has been made to interest J. P. Morgan & Co.

Monnett To Appeal Suit

COLUMBUS, Dec. 30—Plans to carry to the Court of Appeals his suit asking appointment of a receiver for the Goodyear Tire & Rubber Co. at Akron has been announced by Frank S. Monnett, minority stockholder.

The petition filed recently in Common Pleas Court here will be dismissed at his own cost, Monnett said, instead of being amended, so as to expedite an appeal.

ROAD FEES BASED ON TRANSMISSIONS

BOSTON, MASS., Dec. 30—Changes in the motor vehicle fees as proposed by Commissioner Cole would differentiate between light cars of equal horsepower which use planetary and sliding gear transmission. Cars under 30 hp. with the planetary system would pay $15 annually and those with sliding gear, $20. No reason has been given why this distinction should be made and none is apparent.

Cars from 30 to 40 hp. now paying $15 will be jumped to $30 if the new rates are accepted. Those above 40 hp. now paying $20 will pay $40. Motorcycles will be assessed $10. Rates to dealers for number plates will be increased 100 per cent.

Trucks of 2 ton or under will pay $20; 2 to 3 ton, $50; 3 to 5 ton, $100, and above 5 ton, $150. Trucks now pay a flat fee of $10 a ton.

Fordney Opposes Cut in Automobile Tariff

WASHINGTON, Dec. 29—Chairman Fordney of the House Ways and Means Committee will oppose the proposals of the automotive industry for a revision of the tariff downward according to members of the committee. It was learned to-day that manufacturers in Michigan are bringing pressure to bear on the chairman, who represents a Michigan district, pointing out that the industry needs foreign markets before unemployment can be stopped.

It is Fordney's plan to recommend a higher tariff generally, though it is entirely probable that the testimony of representatives of the industry here may impel the majority of the committee to make an exception in the case of automobiles.

FRANK LEAVES FIRESTONE

NEW YORK, Dec. 29—A. C. Frank, who for five years has been export manager of the Firestone Tire & Rubber Co., 1871 Broadway, has resigned. Mr. Frank is going to continue in the export field, but has not located. He has been connected with export work for nearly twenty-five years, having traveled extensively in Europe, South America, the West Indies, and having had experience in practically every department of export work.

Stockholders Ratify Management Plans

Monnett Hooted at Meeting in Akron—Audit Shows Position Strong

NEW YORK, Dec. 27—Difficulties which have beset the Goodyear Tire & Rubber Co. for the last few weeks are being straightened out rapidly and one of the prominent members of the banking syndicate which has undertaken the refinancing of the company to-day declared it "splendidly solvent." The suit filed by Frank S. Monnett, former attorney general of Ohio, asking for a receiver, an injunction against additional financing and making serious charges against the directors, was dismissed by Judge Kinkead at Columbus on Thursday, on the ground that the papers had not been served on an officer of the company. Although the dismissal was upon a technicality there is no apprehension over a possible receivership even if the suit is filed again at Akron, as threatened by Monnett.

The stockholders, at a special meeting at Akron, Friday, approved almost unanimously the refinancing plan and expressed their confidence in the present officers and directors. Monnett attended the meeting as the owner of 45 shares of preferred stock and tried to block the financing resolution, but was defeated overwhelmingly. He was hooted from the floor when he attempted to force his motion, which was not seconded. His attendance at the meeting was a surprise, and it was not known he was there until he took the floor.

The affairs of the company moved swiftly late last week, and the outlook now is fully as encouraging as it was before Monnett took his unexpected action. The bankers who have become interested in the company were in almost continuous session all week, and while they have issued no formal statement, it is understood that they have decided to go ahead with the new financing plan.

Net Assets Are $110,380,596

Deep interest in the future of the company was manifested by the stockholders and the meeting Friday was the largest ever held. W. E. Young presided at the session and W. E. Palmer was elected secretary. President F. A. Seiberling submitted an audit of the books and accounts as made by Price, Waterhouse & Co. as of Oct. 31, which showed the condition to be as follows:

Total assets, $153,076,840; total liabilities, exclusive of issued and outstanding capital stock, both common and pre-

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Setting Completed for New York Show

"Business as Usual" Theme of Meetings—Social Features to Be Attraction

NEW YORK, Dec. 29—Every element of the automotive industry in New York is making ready for "show week" starting Jan. 8, and about all that remains to be done is to raise the curtain. There is every indication that more dealers and manufacturers will attend than ever before and they will be kept busy from morning until late at night. "Business as usual" will be the main theme of all the scores of meetings which have been arranged but it is realized that most of the men who are coming have been thinking of business so much of late that their heads ache and plenty of amusement will be provided for them for a change.

Dealers are coming to the convention in droves. Many of the manufacturers have intimated to their sales organizations, politely but pointedly, that it would be well for them to get to the shows this year. They can't fail to get inspiration from them and are expected to go home with the firm resolve to "get back to business." Everything possible will be done to put them in this frame of mind. One of the important factors leading to this end will be numerous meetings at which speakers who can hit from the shoulder will tell why there is nothing to worry about and how the public can be sold on the essentiality of automobiles.

Dealer organizations in different parts of the country are preparing to join in the advertising campaign which is designed to convince everybody that automobiles are transportation and not luxuries. This movement is not confined to the largest cities. The Milwaukee Dealers Association plans to spend $10,000. The Topeka association has decided to do something and the dealers in New Haven intend to get in the procession.

Hotel Rates at Usual Levels

New Yorkers always have been interested in passenger car shows and this year is no exception. They are going to do everything they can to make the visit of the automobile men pleasant, at the same time reaping a modest profit. Thanks to the efforts of the National Automobile Chamber of Commerce and the Motor and Accessory Manufacturers Association, however, the hotel proprietors have taken off their pirate garb and agreed to keep rates at the usual levels. It was explained to the owners of the largest houses that there are hundreds of perfectly good hotels in perfectly good locations on side streets that would be glad to get patronage at reasonable prices if the big hostelries were unreasonable and this had a salutary effect.

Special automobile entertainment will be provided in all the cabarets and in the hotel restaurants. The motion picture houses will flash automobile films on the screens and the stores will display automobile toggery. The New York dealers will hold open house all week in their club rooms.

The manufacturers will be just as busy as the dealers for the "big four" associations will hold their annual meetings as well as all kinds of group sessions. There will be some kind of business meeting both interesting and profitable for every car, tire and parts maker and every engineer. The banquets starting Monday night will be a big entertainment feature.

Rubber Association Program Set

The first feast will be that of the Rubber Association of America. There will be three speakers, including P. E. Blondin, postmaster general of Canada, and Congressman Fish of Ohio. The third has not been announced.

The N. A. C. C. will feast Tuesday night. There will be two speakers, one of them James Schermerhorn, editor of the Detroit News. It is practically certain the other will be one of the real leaders of industrial life in America. There will be the usual stunts and a song leader who could put "pep" into a funeral.

The banquet of the M. A. M. A. promises to be a lively session. The only problem to be considered will be that of food and there will be no speakers but there will be SOME entertainment. It will be under the direction of the theatrical man famous for the production of musical shows with the most beautiful chorus girls. He has offered the services of his feature acts.

The annual meeting of the M. A. M. A. will be held Wednesday and in addition to the usual business there will be an innovation in the form of an open forum. This will be a general discussion of the association's activities. The speaker at the meeting will be George M. Graham, vice-president of the Pierce-Arrow Motor Car Co. No long, formal reports will be presented. To stimulate interest in the show "on to New York" committees have been formed in Detroit, Chicago, Cleveland, Buffalo, Akron and Indianapolis and they will compete for the honor of having the largest delegation present. It is expected that close to 400 manufacturers will be in the city for the week, representing every important automobile and equipment plant.

Details of the annual dinner and frolic of the S. A. E. on Thursday night have not been arranged but there will be several speakers and the banquet will be followed by a dance.

MEETINGS AND BANQUETS SCHEDULED FOR WEEK OF NEW YORK SHOW

MONDAY, JAN. 10

10:00 am. and 2 pm.—Automotive Service Associations Convention, Hotel Commodore.
2:30 pm.—Rubber Assn. of America Annual Meeting, Yale Club.
7:00 pm.—Rubber Association of America Banquet, Waldorf-Astoria.

TUESDAY, JAN. 11

10:00 am.—N. A. C. C. Foreign Trade Committee Meeting, N. A. C. C.
10:00 am.—N. A. C. C. Patents Committee Meeting, N. A. C. C.
10:00 am. and 2 pm.—Society of Automotive Engineers, Standards Committee Meeting, 29 West 39th St.
10:30 am.—N. A. C. C. Highways Committee Meeting, N. A. C. C. headquarters.
2:30 pm.—N. A. C. C. Motor Truck Committee Meeting, N. A. C. C.
7:00 pm.—National Automobile Chamber of Commerce Banquet, Commodore.
8:00 pm.—Society of Automotive Engineers, Aeronautic Session, 29 West 39th St.

WEDNESDAY, JAN. 12

10:00 am.—N. A. C. C. Directors' Meeting, N. A. C. C. headquarters.
10:00 am.—Society of Automotive Engineers Meeting, 29 West 39th St.
2:00 pm.—Society of Automotive Engineers, Body Engineering, Aeronautic and Chassis Sessions, 29 West 39th St.
2:00 pm.—Motor and Accessory Mfg. Assn. Annual Meeting, Commodore.
7:00 pm.—Motor and Accessory Mfrs. Assn. Banquet, Commodore.
9:00 pm.—Society of Automotive Engineers Carnival, Hotel Astor.

THURSDAY, JAN. 13

10:00 am.—Society of Automotive Engineers, Fuel Session, 29 W. 39th St.
2:00 pm.—Society of Automotive Engineers, Fuel and Highway Sessions, 29 West 39th St.
7:00 pm.—Society of Automotive Engineers Banquet, Hotel Astor.

M. A. M. A. Gives Sanction to Minneapolis Exhibit

NEW YORK, Dec. 29—The Board of Directors of the Motor and Accessory Manufacturers Association has sanctioned the Northwestern Automotive and Industrial Exposition to be held in Minneapolis, Feb. 5 to Feb. 12. The show will be housed in the mammoth new building of the Northwest Terminal Co. This is conveniently located and adapted for a show of large proportions.

Preliminary indications point to a record breaking demand for space at this show from the parts, units, and accessory manufacturers affiliated with the Motor and Accessory Manufacturers Association. The dominant position of Minneapolis in relation to the Western and Middle Western automotive markets makes this show of unusual significance and value to the industry.

Newspapers Break Ban on Publicity

Globe and Mail to Resume Former Policy—All Open for Show News

NEW YORK, Dec. 29—Publishers of New York newspapers who banded together several months ago to curb automobile publicity are breaking away from this agreement and two of them already have filed declarations of independence. These papers are the Globe and Evening Mail.

Jason Rogers, publisher of the Globe, has informed his fellow publishers that while he will stay with them on questions of publicity for other interests which are not entitled to it, publication of automobile news will be left hereafter to the discretion of his automobile editor, George Severin.

The Evening Mail will resume its former editorial support of the automobile business. John C. Wetmore, dean of newspaper automobile editors in this city has mailed notices which say:—

"I am pleased to announce that during and after the coming motor truck and passenger car shows in this city, Jan. 3 to 15, 1921, The Evening Mail will resume its long-time policy of publishing daily the latest and fullest news of the automobile industry and sport. The resumption of this policy will enable The Evening Mail to continue and emphasize its unrestricted support of the motor car trade, which has been a conspicuous feature of the paper in its daily automobile column, conducted for 16 years by me as the successor of men of such prominence in the sport and industry as Malcolm Ford, Alfred Reeves and A. G. Batchelder, its former editors."

The publishing association announced some time ago that the bars on publicity would be down for automobile show week and many of them will publish daily stories next week in regard to the automobile industry.

Stockholders Ratify Management Plans

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ferred, and including reserves for contingencies, $42,696,243 leaving net assets after payment of all liabilities to be applied to the outstanding capital stock, of $110,380,596. This shows net assets sufficient to pay the entire outstanding preferred stock in full at $100 per share and still leave $44,247,073 for the common, which would mean a book value of $73 87 per share. In this audit the good will of the company, which is undoubtedly large, was not considered at all, and all raw material, including rubber and fabric, was invoiced at its market value regardless of what it cost.

The stockholders who attended the meeting in person numbered about 1200 and there were represented by proxy 498,129 shares of preferred and 546,363 shares of common. A resolution was adopted giving the consent in writing of the preferred stockholders to the issuance of not to exceed $50,000,000 in first mortgage bonds or notes to run twenty-five years at 8 per cent interest. The preferred stockholder vote on this resolution was 499,371 shares in favor of it and 1120 shares against.

Another resolution on which both the preferred and common stock voted, authorized the directors to issue these bonds or notes and execute a mortgage on the property as security. Only 987 shares of preferred stock voted against this resolution and none of the common voted in opposition.

Bonds To Pay Indebtedness

President Seiberling stated that the proceeds of these bonds or notes will be used to pay the present indebtedness and provide additional working capital. He reported that negotiations for permanently financing the company were in progress and that action on them will be taken at another meeting, Dec. 29.

G. M. Stadelman, vice-president in charge of sales, told the stockholders that sales reached their lowest ebb in November and that since that time they have been steadily increasing.

When Monnett objected to approval being given the bond issue because the auditing committee of the stockholders had not checked up the report of the accountants, Judge E. W. Stewart of Akron declared no committee could intelligently audit reports which it had taken skilled auditors weeks to prepare. Immediate sale of the bonds was approved when President Seiberling said a New York house would take over the entire issue. Although he mentioned no names it is assumed he referred to the syndicate headed by Goldman, Sachs & Co.

Goodrich Celebrates Fiftieth Anniversary

AKRON, Dec. 30—The B. F. Goodrich Rubber Co. is commemorating the fiftieth anniversary of the founding of the company by Benjamin Franklin Goodrich, Dec. 31, 1870, by getting out a 48-page booklet, entitled "Golden Year of Goodrich," in which is reviewed the history of the rubber industry and its part in the progress and development of the world.

The founder died before the invention of the automobile, but he lived to see rubber adapted for many purposes, the climax of his endeavors being the evolution of tires for bicycles. Since its first location in Akron the plant has spread from a two-story brick building, 40 x 100 ft., to a group covering 110 acres.

THOMAS LEAVES HYDRAULIC

CLEVELAND, Dec. 29—Owen Thomas has resigned as general manager of the research engineering department of the Hydraulic Steel Co., where he has been for two years, and has opened offices for automotive consulting engineering at 1900 Euclid Avenue, this city.

Westinghouse Unites Automotive Sections

Centralizes Equipment Department in New Springfield (Mass.) Headquarters

SPRINGFIELD, MASS., Dec. 27—The automotive equipment department of the Westinghouse Electric & Mfg. Co. has completed plans to increase the efficiency of its service to car manufacturers, distributers of parts, and car owners. Heretofore, owing to conditions brought about by the war, the main sales office of this department, the works, the engineering division and service division were all located in different cities. Now all divisions have been established here, and this centralization is expected to be advantageous to the company and to its automotive customers.

For manufacturing, a modern plant, entirely specialized, has been completed at Springfield. The installation of new machinery in the new works and foundry buildings is completed, and provides capacity for five years' estimated growth.

The building itself is of a single story, saw-tooth construction, and measures 100 x 1000 ft., with two projections, each 80 x 20 ft. It is constructed of concrete and steel, with a concrete floor built to withstand heavy traffic, and a cement tile roof entirely enclosed with metal sash glass.

The allotment of the floor space by the different departments and the tool layout was determined by the planning department, under the supervision of A. B. Reynders, works manager, at the time ground was broken. The general assignment of space is as follows: Machining section, 33-1/3 per cent; armature and coil section, 25 per cent; special accessories, 16-2/3 per cent, and finish assembly and test, 25 per cent.

The automotive engineering department, under charge of R. G. Thompson, is located in the plant. There are two main divisions, one of which has charge of the design of new apparatus and the other with the application of existing apparatus to automotives.

Sales and Service United

A three-story building at 82 Worthington street, together with the third floor of the adjoining Post Office Square Building, houses the general sales department, with its commercial engineers, the service department and the stocks of supply parts.

The purpose of the service department, which is in charge of M. B. Speer, is to give any necessary assistance in repair and maintenance of Westinghouse automotive equipment, the correction of troubles that may arise, and the distribution of supply parts to service stations.

The sales department is headed by G. Brewer Griffin. Sales offices are maintained in Chicago, Detroit, Indianapolis, Cleveland and Springfield.

Ford Plant to Stay Closed Till February

Lack of Orders Declared Responsible for Continued Suspension of Operations

DETROIT, Dec. 29—Instead of resuming operations Jan 3, as planned, Ford Motor Co. has posted notices to employees stating that operations will not be resumed until Feb. 1. While not officially declared, lack of orders was said to have determined the company to continue its suspension of work for an additional month.

There are 60,000 employees in the Highland Park, River Rouge, and Dearborn plants of the company, all of whom are thrown into temporary enforced idleness. Bonus checks for 1919, totaling approximately $8,000,000, will be mailed to employees this week.

Opinions differ on the effect of the Ford action. Emory W. Clark, president of the First and Old Detroit National Bank, declared it would exert but slight influence on business in general. He believed it would be beneficial because it would permit dealers to dispose of their surplus stocks and thereby stimulate demand, which would be reflected in other lines. He thought other plants would reopen on schedule and said few parts makers were entirely dependent on Ford.

Clark asserted the Ford closing would have little effect on business because most of the employees are thrifty and have snug savings bank accounts. Detroit savings accounts reached their peak in October with $215,000,000, and only $6,000,000 had been withdrawn up to Dec. 24. At least a third of the withdrawals was for Christmas shopping.

On the other hand, Frank G. Smith, vice-president of the same bank, asserted the Ford closing could not fail to have a depressing effect and that further withdrawals of savings would tighten the money market. He believed other plants might take action similar to Ford's.

Vice-President Haynes of Dodge Bros. declined to make any statement on the plans of that company for reopening.

Would Relieve Wage Bugaboo

Lawrence Fisher of the Fisher Body Corp. said the Ford action would be beneficial to the industry in that the minimum wage schedule in effect there would not cause other manufacturers to feel compelled to meet it. Wage cuts as heavy as 20 per cent, he said, could now be made. A bad effect of the continued suspension would be the added feeling of depression to all branches of the industry. He feared the suspension would have a tendency to delay the resumption of demand.

Actual damaging effects would be felt by parts makers, he said. Fifteen per cent of the Fisher business was with Ford he said, and curtailments in their employee staffs to this extent would be made. A definite revision of wage schedules would be announced Monday, he said, when many plants resume.

Whether plants making parts for the Ford company would follow the Ford action and continue the closing of their plants beyond Monday was not commented upon by officials. At the Ford plant officials would give no indication of probable wage rates when operations are resumed, nor whether the minimum wage rate would be lowered.

Dodge Plans Sharp Revision

It is reliably reported that Dodge plans sharp revisions of wages and will also continue on its reduced schedule of operations indefinitely. W. J. McAneeny, president of Essex, said he could see no reason why the Ford action should have an effect on other manufacturers.

H. M. Jewett, president of Paige, said Ford dealers were overloaded as a result of the continued heavy production. Ford, he said, must now sweat awhile and give his dealers a chance to clean-up. The Paige plant will reopen Monday with half of the regular force employed. No statement would be made as to the extent of wage cuts.

G. M. C. Directors Meet; Dividend Change Likely

NEW YORK, Dec. 30—Directors of the General Motors Corp. are meeting this afternoon and it is expected some action will be taken on dividends. It is not expected payments will be passed but it is considered practically certain that payment of a quarterly stock dividend on the common will be discontinued, although there may be a slight increase in the cash disbursement on this stock. This will be the first formal directors' meeting since the retirement of W. C. Durant from the presidency and considerable interest attaches to it for that reason. There has been much speculation as to whether any plan would be considered for the stimulation of sales.

Pierre S. duPont, the new president, has devoted most of his time to the company for the past three weeks and is in almost constant conference with heads of departments, especially those in the sales end. He has held frequent consultations with Durant since the latter's return from the South the week before Christmas.

AUSTRALIAN ENGINEER HERE

NEW YORK, Dec. 29—G. Hamilton-Grapes, A.M.I.A.E,, consulting automobile engineer of Melbourne, Australia, is in this country at present to buy automobile parts and to study the shale oil industry and the manufacture of motor fuels in general. Grapes is a member of a technical committee of the Institute of Science and Industry of the Commonwealth of Australia. He is very much interested in the development of a domestic fuel for Australia, and will attend the fuel session of the S. A. E. during the coming New York meeting.

A. E. F. Tires to Lose Adjustment Rights

Manufacturers Will Oppose Disposition Here As First Class Merchandise

NEW YORK, Dec. 29—The sale of large quantities of deteriorated A. E. F. tires and tires made for the French military forces, known to have been made in France to representatives of a syndicate of New York and Chicago jobbers who plan to sell them here, has aroused American manufacturers to action designed to prevent their being sold as first class merchandise.

The number of tires involved is now being investigated by the Rubber Association. They are said to comprise both pneumatics and solids, apparently new and bearing the serial numbers of five American tire makers. None were manufactured less than two years ago and many are believed to be considerably older.

Through deterioration of material, because of age and general exposure, the manufacturers will withdraw all adjustment privileges from these goods. Serial numbers have been kept on which adjustments will be denied and manufacturers seek to prevent imposition on the public by compelling the sale to be made with all the facts known.

Purchases of the tires are being made through French brokers who have taken over the sale for the Government. Prices for which they are obtained are said to be very low and this, too, is being investigated. Arrangements have been made for immediate shipment to the United States and a consignment of 2500 has been landed.

No stipulations were made in the sale of A. E. F. material to the French Government that the supplies could not be offered for sale in the American market. Thousands of American cars were included in the supplies turned over, but no reports have been received of the disposition of the cars.

ALUMINUM TARIFFS OPPOSED

NEW YORK, Dec. 29—Representatives of the National Automobile Chamber of Commerce and the Motor and Accessory Manufacturers Association will appear before a House committee in Washington Jan. 12 to protest against a proposal to increase the tariff on aluminum. It will be contended that present prices are high enough and that there is no justification to hold them up or make them higher by raising tariff barriers. The N. A. C. C. already has gone on record as favoring a lower tariff on automobiles. This stand has been taken on the ground that it would stimulate business in foreign markets and that American manufacturers are abundantly able to take care of themselves when it comes to competition at home from foreign makers.

British Depression Ascribed to Taxes

Former Minister of Finance Warns Armament Expenditures Must Be Reduced

LONDON, Dec. 10—(*Special Correspondence*). Some weighty addresses have been given by recognized British finance authorities which cannot be ignored by the trades at large, and especially such as the automotive trades, which are so largely dependent on general trade stability and prosperity for their own existence.

First Sir George Paish, a leading British finance authority, who acted in the United States as a financial intermediary during the war, has warned the public that with the £ at 30 per cent and the franc at 70 per cent below par, and America no longer willing to finance British business, the situation is approaching a condition pointing to a breakdown of commercial deals.

Now comes a similar warning from Reginald McKenna, formerly Minister of Finance in the British Government and now head of one of the leading banking corporations who confirms the Paish warning and points out, contrary to common belief, that the only means of bringing down prices is by increasing production, that recent figures show the contrary to be the case.

He instances the period from June 1919 to June 1920 during which prices *rose 27 per cent while purchasing power increased by not more than 6 per cent, whereas productino during that period was much greater than at the beginning.* He attributes the present situation to the effect of excessive taxation which while it increases purchasing power does so at the expense of production. The cumulative effect he said is to drive up prices so that people have nothing to save, or alternatively to invest, whether in the business concerned or in stocks or in motor cars, and consequently the heavy taxation is restricting enterprise. Before the war Britain saved about 25 per cent of the yearly national income. Finally he warned European countries that to go on spending on armaments was not merely to exhaust resources, but actually to destroy the world.

FUEL COMPLAINTS HEARD

WASHINGTON, Dec. 29—One complaint against a manufacturer of automobile oils was issued and another dismissed by the Federal Trade Commission to-day. The commission announced the dismissal of its complaint of unfair competition against the Great Western Oil Co., Cleveland, O., with respect to certain untrue advertising of a motor fuel put on the market by this company. The company conceded the use of the advertising charged, which was discontinued prior to the issuance of the complaint.

Upon application for the issuance of a complaint the commission has cited the Carbo Oil Co., Cleveland, O., in complaint of unfair competition in the manufacture and sale of motor lubricating oils. The complaint alleges that a certain automobile lubricant marketed by a long established concern has become well known to the trade and that the Carbo company in attempt to imitate this product has compounded and placed on the market a product known as "Mobile A Oil" and represented this oil as the product of its competitors.

Clark Company Makes Speed Wagon Axle

CHICAGO, Dec. 27—A new speed wagon axle of the bevel gear type has been put in production by the Clark Equipment Co. of Buchanan, Mich. This axle is intended for use only on trucks of one ton or less. It has a pressed steel load carrying member or housing, and the differential is supported in a carrier and can be removed from either the front or rear of the axle. Radial and thrust loads are taken on Radax ball bearings.

The wheel bearings are of the straight roller type and take thrust in both directions. They are so mounted that the thrust on each wheel is taken care of independently by its particular bearing, rather than transmitting the thrust in the direction of the wheel bearing on the opposite side. Taking the thrust in both directions on one wheel bearing tends to eliminate wabble and wheel looseness.

The hub is mounted on a 6-splined shaft, and when it is drawn up tightly it clamps the inner race of the wheel bearing. Brakes are internal, 2½ in. wide, of special design, using four shoes to each wheel. The brake parts are bushed with oilless bearings, and are easily replaced when worn. This axle is designed to carry 3000 lb. on the spring pads, and to take care of a 1600 inch-pound torque motor. Two standard gear reductions can be furnished, viz., 5.9 and 6.2; the 6.2 reduction being obtained with spiral bevel gears. The weight of the axle is approximately 360 lb. complete with hub parts.

Maxwell to Continue Newcastle Parts Plant

NEWCASTLE, IND., Dec. 28 — Rumors to the effect that the Newcastle plant of the Maxwell Motor Co. will not be reopened were refuted last week when three officers of the company, W. Ledyard Mitchell, president; A. E. Baker, general sales manager, and A. A. Richmond, general superintendent of the service department, were here inspecting the factory.

President Mitchell said here that the assembling plant at Detroit is to start at once assembling fifty cars a day, and that as soon as the present supply of parts is used up it will be necessary to put the Newcastle plant in operation again. In addition to this, the forge work and other parts for the Chalmers will be done here.

METAL MARKETS

ALTHOUGH the last week of the year is one of inactivity even in the so-called "good iron years," and 1920 will be recorded as one of the "bad years" in spite of the price boom of the first half, sentiment in the pig iron as well as in the steel and non-ferrous metal markets is rather optimistic than otherwise. One is tempted to speak of the good "morale" of the markets; this would be misleading, however, for the simple reason that, especially in the pig iron market, sellers have become accustomed to praise the market for its "morale" when there is unanimity in adhering to prices no matter how much out of gear they might be with those for related commodities. Improvement in sentiment lies in the genuine eagerness of producers to book 1921 business at any sane figure. Broadly speaking, wages have been cut at least 20 per cent, and with the turn of the year sufficient will be clipped from off the "overhead" to make possible modest profits on the market's readjusted basis. Where wages have not been cut, as for instance in the case of the Steel Corporation, it is taken for granted that the backlog of orders in hand is sufficient to warrant postponement of the day of downward revision. Should the pace at which orders are placed during the first month or two in the new year be exceedingly slow, it will be only natural that preparations for further price reductions as an inducement to buyers will be seriously considered, and one of the first steps in this connection would, of course, be to bring wages more into line with the anticipated cuts in prices. The chastening effect on the pig iron market exerted by cheap offers of 1.75 to 2.25 silicon iron by a prominent Michigan automotive interest has resulted in energetic competition for all the first half year business which may be secured from automotive foundries. There is little doubt that the next few weeks will witness considerable activity in all of the markets, although no one looks for spectacular buying.

Pig Iron—Small tonnages of 1.75 to 2.25 silicon iron are reported to have been taken on by automotive foundries at $30, Detroit furnace. This pig is supposed to be from the Ford furnaces at River Rouge, although there is no certainty on this score and the resale market is still in fair, odd lot supply. Furnace coke can now be obtained on contract at close to $5. With sliding scale contracts for furnace coke reported on a 5 to 1 basis (the buyer to pay one-fifth the prevalent basic iron quotation for a ton of coke), a $5.50 coke market would certainly imply a relatively easy tone in a $30 pig iron market.

Steel—Although most of the steel makers look to the railroads for the principal tonnages that will be bought in the first quarter of the new year, tentative inquiries show that orders for modest amounts of steel are likely to be placed by the automotive industries before February 1. Independent makers of hot-rolled strip steel now quote 3.30c. Prices, otherwise, are unaltered.

Brass—Connecticut valley brass mills continue to operate on a greatly curtailed basis, but gradual revival in the demand from the automotive industries is looked for after the first of the year.

Tin—Support by the Federated Malaysian Government and improvement in the exchange situation act as a prop for the otherwise highly speculative market.

Copper—Weak, speculative holders have been obliged to liquidate at around 1c. a lb. below the quotation of 14c. named by large producers.

Aluminum—There is still much cheap foreign and resale metal on the market with automotive buyers rather apathetic.

Lead—Although consuming demand is light, the market seems to have dipped close to bottom.

Zinc—Only fairly steady with consumers rather offish.

FINANCIAL NOTES

Reo Motor Car Co. stockholders have authorized an increase in capitalization from $10,000,000 to $15,000,000. No stock dividend was announced, business conditions being such that it was not considered advisable. Directors may take such action at any time without necessity for a further meeting of stockholders. R. C. Rueschaw succeeded R. H. Akers on the board.

Hood Rubber Co. directors have declared a dividend of $1 a share on the new no par value common stock, payable Dec. 31. This is at the rate of $4 a year, equal to $8 dividend rate on the old stock, which was exchanged for the present stock on the basis of two shares for one.

Autosales Corp. for the ten months ended Oct. 31 shows net income after charges and Federal taxes of $118,035, equivalent to $2.22 a share (par $50) earned on the $2,656,150 preferred stock. Assests of the company total $7,575,414 and its surplus over liabilities is $381,729.

Tock Screw Machine Products Corp. has been succeeded by the Automatic Products Corp., taking over its assets and assuming its liabilities. There will be no changes in the personnel, but the company will be reorganized upon a larger financial basis.

Sivyer Steel Casting Co., Milwaukee, has doubled its capitalization, which is now $800,000, the new stock issue being absorbed by present owners. The new capital is to provide for expansion and to finance the growing production.

McGraw Tire & Rubber Co. will pass its usual quarterly dividend on preferred stock to conserve the cash resources of the company. This action was voted upon at a meeting of directors in Cleveland.

Cox's Pneumatic Cushion Co. stockholders will meet Jan. 5 at Phoenix, Ariz., to elect directors and approve the action of the director board in leasing company patents to Henry Seibel.

United States Light & Heat Corp., Niagara Falls, N. Y., has been authorized by stockholders to issue $1,500,000 preferred A stock.

Briggs & Stratton Co., Milwaukee, has increased its authorized capital stock from $1,700,000 to $1,950,000.

Moore Motors Plant Sold for $54,807.09

DANVILLE, ILL., Dec. 27—The Moore Motor Vehicle Co. of this city, which has been in financial difficulties for the past six months, was sold at public auction for $54,807.09 to the American Building Association of Danville. The price represented the mortgage held against the plant by the American company. The bid accepted included 53 acres of land, all of the buildings and the contents of the buildings. The Goldberg Supply Co. of St. Louis bid $35,000 for the land and empty buildings and $12,000 was bid for the machinery, making a total of $47,000. As the bid of the mortgage holding company was far the best, it was accepted by the receiver.

The sale was made in compliance with an order from the Federal court to close up the affairs of the Moore company. The original appraisal of the value of the land, buildings, contents and other chattels was $136,000. It is now evident that the figure was too high and this means that the stockholders will realize little or nothing from their investment.

Captain Charles Cox and George Bennington, both of Chicago, are negotiating for a lease of the defunct Moore Motor Vehicle plant to manufacture airplanes. They have found that the wood-working department is exactly suited to their needs. The two promoters have prepared plans for a passenger airplane and should the initial construction prove a success, it is proposed to manufacture them upon an extensive scale. It is likely that the lease can be effected as the construction can be carried on without interfering with the manufacture of motor vehicles.

Van Briggle Head Sued by Company Receiver

INDIANAPOLIS, Dec. 28—Suit to obtain $275,000 from Lilburn Howard Van Briggle and Frances Mary Van Briggle, his wife, alleged to have been obtained fraudulently from the treasury of the Van Briggle Motor Device Co., has been filed in the local Circuit Court by William R. Hirst, receiver of the company. Van Briggle is president of the company, which went into receivership on petition of a number of stockholders several months ago.

The complaint charges that Van Briggle, as head of the company defrauded it of an amount aggregating more than $243,000 by diverting company funds to his own use. The plaintiff asks a court order cancelling contracts for the payment of royalty by the company to Van Briggle, cancellation of title to real estate held by the defendants as tenants in entirety and sequestration of personal property held by defendants to be applied to the judgment. Many of the charges made in the complaint virtually are repetitions of those made by the stockholders who applied for the original receivership.

MURIEL WHITE KILLED

INDIANAPOLIS, Dec. 30—Friends of D. McCall White, designer of the LaFayette car, are expressing their condolences on the death of his daughter Muriel in an automobile accident, Dec. 18. The child was thrown from an automobile in which she was riding with her father, mother and brother, when it was rammed by another car approaching from the left, and was killed instantly.

SOUTH AMERICA BUYS TRACTORS

INDIANAPOLIS, Dec. 30—The export department of the Midwest Engine Co. reports the signing of a contract with its South American distributer for 1000 utilitors. The policy of maintaining direct factory representation in foreign countries is working out satisfactorily, it was declared. A distributer will be appointed for the British Isles in the early part of 1921.

Bank Credits

Written exclusively for AUTOMOTIVE INDUSTRIES *by the Guaranty Trust Co., second largest bank in America.*

NEW YORK, Dec. 28—There was little change in the money market last week. Funds were plentiful but due to the extensive liquidation in the stock market there was little demand. Call money ruled at 7 per cent, which has been the prevailing rate since the first of the month. The range, as in the week before, was from 6 per cent to 7 per cent. Time money held firm at rates slightly higher than those quoted a week ago. Sixty and ninety days' paper was quoted at 7¼ per cent to 7½ per cent and the longer maturities at 7 per cent to 7¼ per cent for loans secured by regular mixed collateral. All-industrial loans were quoted at about ¼ of 1 per cent higher than these rates.

The week-end bank statements seem to indicate a return to this center of funds which all Fall have been flowing to the interior. The New York Reserve Bank improved its reserve position through an increase in total cash reserves of $30,417,000. This gain was more than enough to offset increases of $37,176,000 in total net deposits and $9,348,000 in Federal Reserve notes in circulation at this center. The gain in cash reserves was, in the main, occasioned by an increase in gold reserves of $29,357,000 as a result of large credits in the gold settlement fund. Total earning assets increased $19,618,000.

The passing of the strain incident to the large tax payments was reflected in the condition of the New York Associated Banks. Loans were reduced $36,251,000 as contrasted with an increase the week before of $115,576,000 when there was a swelling of loans over the tax date.

While recessions in commodity prices were less marked again last week, the general slowing up of business is reflected in cancelled orders and decreased production, especially among the independent steel producers. The latter, it is said, are now operating at 30 per cent to 35 per cent of capacity. The U. S. Steel Corp. is maintaining production close to 90 per cent of capacity. An encouraging feature in last week's steel news was the placing of orders for 200,000 tons of rails by the Pennsylvania Railroad and 75,000 tons by the New York Central. The Pennsylvania order, which is much larger than its normal annual requirements, was distributed 50 per cent to the U. S. Steel Corp. and 50 per cent to independent producers.

WHIPPLE JOINS REPUBLIC

DETROIT, Dec. 29—A. J. Whipple, formerly general sales manager of the Diamond T Truck Co., has joined the Republic Motor Truck Co. as general sales manager. Whipple is a member of the truck committee of the National Automobile Chamber of Commerce and a former director of the National Association of Sales Managers.

MEN OF THE INDUSTRY

H. L. Dean has resigned as manager of the compressor and engine sales division of the Chicago Pneumatic Tool Co. J. F. Huvane has been appointed eastern manager of compressor and engine sales with headquarters in New York. G. C. Vanden Bloom has been appointed western manager of compressor and engine sales with headquarters in Chicago.

George Seibert has been named assistant sales manager of the William Small Co., Indianapolis, manufacturer of Monroe automobiles. He will make his first appearance with the Monroe sales force at the New York and Chicago shows. He was formerly with the Gray Dort Motors, Ltd.

J. A. Graham has resigned as Minneapolis branch manager of the Studebaker Corp., effective Dec. 31. Beginning in 1921 he will assume the position of vice-president and general manager of the Houdaille Co., Buffalo, in which he has acquired an interest.

John H. Dielmann and **W. D. Dalton,** for a number of years with the Weinstock-Nichols Co., Los Angeles have entered business for themselves as the John H. Dielmann Co., Los Angeles. They will act as agents for manufacturers.

Horace E. Eckhouse, 1834 Broadway, New York, has been appointed distributer of the "Wisoid" gaskets manufactured by the Consolidated Packing & Supply Co. of the same city.

William Mack, advertising manager of the Borg & Beck Co., Moline and Chicago, has been appointed sales manager of the company. His headquarters will be in Chicago.

Lewis L. Clarke has been appointed a member of the executive committee of the American-La France Fire Engine Co., Inc.

Brown Stockholders Request Accounting

MOLINE, ILL., Dec. 27—Suit has been filed in the Rock Island County Circuit Court against the Brown Motors Co. by Sherman N. Johnson, Harry Ranson, Morris W. Battles, William T. Hinman, William McMullen, Earl L. Ewing and Calvin Ainsworth, asking for an accounting of the money paid into the treasury by the stockholders. In their bill, the complainants allege that the books of the defendant company have been transferred from the Moline office to Chicago and inspection requested by the stockholders has been refused.

It is further alleged in the bill that Walter E. Brown, inventor of the engine, whose production plant was to have been located in Moline, and president of the company which bears his name, has conspired to ruin the financial standing of the company to better his own ends. Representations are made in the bill that Brown holds the patent rights of an internal combustion motor, for the manufacture of which the company was organized Jan. 5, 1917.

Of the original stock of $20,000, Brown was to receive 51 per cent for rights of manufacture. Subsequently, the capital stock was increased to $50,000 and later to $200,000. It is related in the bill that Brown continued to vote himself the controlling interest through a board of directors of his own selection. It is further alleged that Brown is unlawfully claiming stock to the amount of $132,000 and that he has drawn a large salary as president and general manager without corresponding service.

It is further averred that Brown has asked for the dissolution of the company. This is opposed by the minority stockholders and they will seek an investigation through the medium of the courts. The Brown motor was never manufactured in any considerable quantity but a large amount of the capital stock is held by investors of Moline and Rock Island. They will bitterly contest the proposal to disband the corporation until reimbursed for the money they subscribed for stock.

CHESTER E. CLEMENS DIES

CLEVELAND, Dec. 27—Chester E. Clemens, mechanical engineer of the Standard Parts Co., died Dec. 24, 1920, aged fifty-two years. He was born July 12, 1862, at Troy, N. Y. His experience was varied, having served successively as machinist, foreman and superintendent of the Ariel Cycle Co., Goshen, Ind. He next organized the Clemens & Curtiss Co., New York, and was its superintendent and manager. From here he went with Guiterman, Rosenfeld & Co., exporters of New York, as a buyer of machine tools and products. He was next connected with the Cycle & Tool Mfg. Co., Springfield, Mass., as engineer, and from there went to the Massachusetts Automobile Club at Boston, where he was master mechanic.

He next entered the employ of the Napier Motor Co. of America, which was also located at Boston, as an engineer, leaving there to accept the position of engineer of the automobile department of the St. Louis Car Co., St. Louis. He subsequently returned to his position as engineer of the Napier company, and from there went to Cleveland as mechanical engineer of the Perfection Spring Co. When the Standard Parts Co. was organized, Clemens became mechanical engineer of that organization. He was elected to member grade of the Society, Oct. 4, 1908.

CRAWFORD HEADS BOLLSTROM

ST. LOUIS, MICH., Dec. 24—F. W. Crawford was elected president of the Bollstrom Motors Corp. of this place, at the annual meeting at which directors were elected and the capital increased from $200,000 to $2,000,000. The directors discussed at length the prospects for manufacturing, and it was the consensus that a light, rapid truck was in greatest demand at this time, though no definite action as to manufacturing program was outlined. Directors elected in addition to Crawford were W. H. Hall, W. E. Barstow and Louis Martin of St. Louis; C. F. Berger of Saginaw, L. M. Russell of Merrill, and W. F. Markham of Alma.

INDUSTRIAL NOTES

Wayland Specialty Mfg. Co., Inc., is planning the erection of a $200,000 plant at Wayland, N. Y., for the expansion of its manufacture of automotive accessories. These are put out under the name Wa-product.

J. B. S. Mfg. Co., Elmira, N. Y., has purchased the business of the Ellis Smith Mfg. Co., and the entire line of E. & S. products are now in production in its plant.

Republic Rubber Corp. has moved its New York office from 229 West Fifty-eighth Street to 221-23 West Thirty-seventh Street.

Medina Rubber Co. has started the erection of a new plant at Medina, Ohio, which is expected to be in production in April.

Surete Mfg. Co., Providence, R. I., manufacturer of a switching device, has changed its name to the Howard Mfg. Co.

Service Motors Builds New Light Speed Truck

WABASH, IND., Dec. 24—A speed truck, designated as Model 15, the "Red Pyramid Speed Truck," of from ¾ to 1-ton capacity, has just been announced by the Service Motor Truck Co., after the completion of a 1200 mile experimental run, under the supervision of Chief Engineer Charles Guernsey and Experimental Engineer Malcolm Randall.

At the front end of the truck a semi-elliptic spring is mounted crosswise, the ends being carried on the axle and the center supporting the frame. This spring is pivoted at its central point, and the front axle is perfectly free to move about this pivot. Another feature of construction resides in the shackle bolts, which are drawn from a single sheet, and after being carbonized are finished in the usual manner. These bolts are of 1¼-in. outside diameter and contain an oil reservoir ⅞-in. in diameter. The oil feeds by splash through felt pads from the reservoir to the working surfaces outside. The oil supply is replenished by lifting up the spring cap on the carrier and filling with an ordinary measure.

SAXON TAKES ON LUBRICATOR

DETROIT, Dec. 27—The Saxon Motor Car Co. has closed a contract with Roberts & Monroe, Inc., of Bridgeport, Conn., for the exclusive use of the Romon automatic chassis lubricator for one year. The show cars of the Saxon Motor Car Co. will be equipped with this apparatus, which is a centralized lubricating tank taking care of the bearings at all points of the chassis. The device, which has been described in these pages, consists of a box or tank containing a series of pumps operated by a hand lever in an accessible position of the car. Periodically, three or four strokes on the hand lever forces lubricating oil under pressure to all points of the chassis requiring lubrication. The installation of this device and its exclusive employment on the Saxon chassis will be featured by this concern at its New York and Chicago exhibits.

Calendar

SHOWS

Jan. 3-8 — New York, Motor Truck Show, Motor Truck Ass'n of America, Twelfth Regiment Armory.

Jan. 8-15—New York. National Passenger Car Show, Grand Central Palace. Auspices of N.A.C.C.

Jan. 10-17—Portland, Ore., Annual Automobile Show, Automobile Dealers' Ass'n. Municipal Auditorium, M. O. Wilkins, Mgr.

Jan. 15-22—Philadelphia, Annual Automobile Show, Philadelphia Automobile Trade Ass'n.

Jan. 17-23—Milwaukee, Annual Automobile Show, Milwaukee Automotive Dealers' Ass'n.

Jan. 22-27—San Francisco, Second Annual Pacific Coast Automotive Equipment Exposition, Auditorium.

Jan. 22-29—Baltimore, Annual Automobile Show, Baltimore, Automobile Dealers' Ass'n, 5th Regiment Armory, J. C. O'Brien, Mgr.

Jan. 22-29—Cleveland, Annual Passenger Car Show, Cleveland Mfr's & Dealers' Ass'n, Wigmore Coliseum.

Jan. 22-29—Montreal, Annual Automobile Show, Montreal Automobile Trade Ass'n, Motordrome Bldg.

Jan. 29-Feb. 4 — Chicago, National Passenger Car Show, Coliseum, Auspices of N.A.C.C.

Feb. 5-12—Minneapolis, Annual Automobile Show, Minneapolis Automobile Trade Ass'n.

Feb. 6-12—Columbus, National Tractor Show, Columbus Tractor & Implement Club, Ohio State Fair Grounds.

Feb. 12-19—Hartford, Conn., Annual Automobile Show, Hartford Automobile Dealers Ass'n. Armory, Arthur Fifoot, Mgr.

Feb. 12-19—Kansas City. Annual Automobile Show, Kansas City Motor Car Dealers' Ass'n.

Feb. 14-19—St. Louis, Annual Automobile Show, St. Louis Automobile M'f'rs & Dealers' Ass'n, Robt. E. Lee, Mgr.

Feb. 14-19—Winnipeg, Western Canada Automotive Equipment Show.

Feb. 18-28—San Bernardino, Cal., National Orange Show, Fred M. Renfro, Mgr.

Feb. 19-26—San Francisco, Fifth Annual Pacific Automobile Show, Exposition Auditorium, George Mahlgreen, Mgr.

Feb. 21-26—Louisville, Annual Automobile Show, Louisville Automobile Dealers Ass'n, First Regiment Armory, C. L. Alderson, Sec'y.

Feb. 21-26—Salt Lake City, Annual Automobile Show, Intermountain Automotive Trades Ass'n, W. D. Rishal, Mgr.

Feb. 26-Mar. 5—Buffalo, Annual Automobile Show, Buffalo Automobile Dealers Ass'n, 74th Regiment Armory, C. C. Proctor, Mgr.

Mar. 2-10—Des Moines, Annual Automobile Show, Coliseum, C. G. Van Vliet, Mgr.

Mar. 5-12—Brooklyn, Annual Automobile Show, Brooklyn Motor Vehicle Dealers' Ass'n, 23d Regiment Armory, George C. Lewis, chairman.

Mar. 7-12—Syracuse, N. Y., Annual Automobile Show, Syracuse Automobile Dealers Ass'n, Armory, Howard H. Smith, Mgr.

Mar. 7-12—Indianapolis, Annual Automobile Show, Indianapolis Automotive Trade Ass'n, Automobile Bldg., State Fair Grounds, John Orman, Mgr.

Mar. 12-19—Boston, Annual Automobile Show, Mechanics Bldg. and South Armory.

Mar. 14-19—Omaha, Annual Automobile Show, Omaha Automobile Trade Ass'n, Inc., Omaha Auditorium, C. G. Powell, Mgr.

April 4-9—Seattle, Annual Automobile Show, Seattle Motor Car Dealers' Ass'n, Arena Hippodrome.

April— Chattanooga, Tenn., Spring Automobile Show, Chattanooga Automotive Trade Ass'n, Sunday Tabernacle, C. A. Noone, sec'y.

FOREIGN SHOWS

Jan. 7 — Sydney, Australian Motor Show.

Jan. 22-29 — Colombo, Ceylon Motor Show.

Feb. 7—Delhi, India, Delhi Motor Show.

Mar. 23-28—Witwatersrand Agricultural Show including machinery and motors sections.

CONVENTIONS

Jan. 7—New York, Advertising Managers Council, Motor & Accessory Manufacturers' Ass'n.

Jan. 11-13—S. A. E. Annual Meeting, New York City.

Feb. 2-4—Chicago, First Annual Meeting, Automotive Electric Service Assn. Hotel La Salle.

May 4-7 — Cleveland, National Foreign Trade Council.

Oct. 12-14, 1921—Chicago, Twenty-Eighth Annual Convention National Implement & Vehicle Ass'n.

To Show Automobiles in Mexican Capitol

NEW ORLEANS, Dec. 24—Announcements received here from Mexico City state that an automobile show will be held in the capital of the Southern republic in March, 1921. The American Chamber of Commerce, in Mexico City, originated the idea, and is the main factor in carrying it out. From present indications the show will be devoted more to the interests of the manufacturers having representatives in Mexico than to the dealers of that country, most of whom are Americans or Frenchmen. The show is to be held in the new $25,000,000 opera house, if that building is completed in time for the opening. The show is also intended to be of assistance to the nation-wide road-building program recently outlined by the new Mexican government, by which it is proposed to connect the capital of each of the twenty-seven states and three territories with every other capital, and with Mexico City, as well as with all the ports of the country.

AUSTRALIAN RULING CHANGED

NEW YORK, Dec. 27—The Commissioner in this city of the Commonwealth of Australia announces that under a court decision over-ruling the stand of the Department of Trade and Customs, importations into Australia from all countries will be dealt with in future, for duty purposes, on a basis of the bank rate of exchange current at date of shipment. Thus, for duty purposes, invoice values of goods shipped from the United States will not be converted at the previous fixed rate of $4.86 to the pound sterling.

ERICSSON BANKRUPTCY DENIED

BUFFALO, Dec. 29—Denial that the Ericsson Mfg. Co. is bankrupt, as alleged in an involuntary petition filed against it by three small creditors, was contained in an answer filed in the name of the receivers, William D. Hickey and D H. Donaldson. Trial by jury of the insolvency charge is demanded. Similar answers also were filed by the H. A. Wilson Co. of New York and the Norma Co., whose claims aggregate $50,000. The merchandise creditors' committee had demanded that the receivers combat the insolvency allegation which they had not been inclined to do.

GILLETTE RUBBER REORGANIZES

MILWAUKEE, Dec. 27—The Gillette Rubber Co. of Eau Claire, Wis., originally incorporated under the laws of Maine, has filed articles in Wisconsin. The reincorporation is part of a general reorganization plan being carried out by the present stockholders in co-operation with a committee of bankers and other creditors who are in charge of the financial affairs until April 5, 1921. S. P. Woodard of New York is president, and R. B. Gillette of Eau Claire is vice-president and general manager.

Syracuse to Start Transportation Course

SYRACUSE, N. Y., Dec. 27—Recognizing the importance of highway building problems caused by the tremendous increase in motor transportation, Syracuse University has created in the College of Business Administration a Department of Transportation in which much attention is being paid to motor transportation. This department has been endowed by H. H. Franklin, president of the H. H. Franklin Motor Car Co.

The course is being conducted by Dr. Chas. L. Raper, professor of transportation. He is developing the course from the broadest business point of view as well as along the lines of government aid and regulation. Problems of maintenance and depreciation, loading and speed, competition of the motor car and the horse-drawn vehicle, the street car and the steam railway are considered. Another phase taken up is the relation of the motor car to the building and maintenance of streets and highways.

The course has been worked out along practical lines. The student must know how to operate and care for a car before he is permitted to take the course. He must make a careful study of some practical problem of motor transportation in his own county. Several such studies of motor car problems now are being made in New York cities and rural communities. Similar problems in other States also are being considered.

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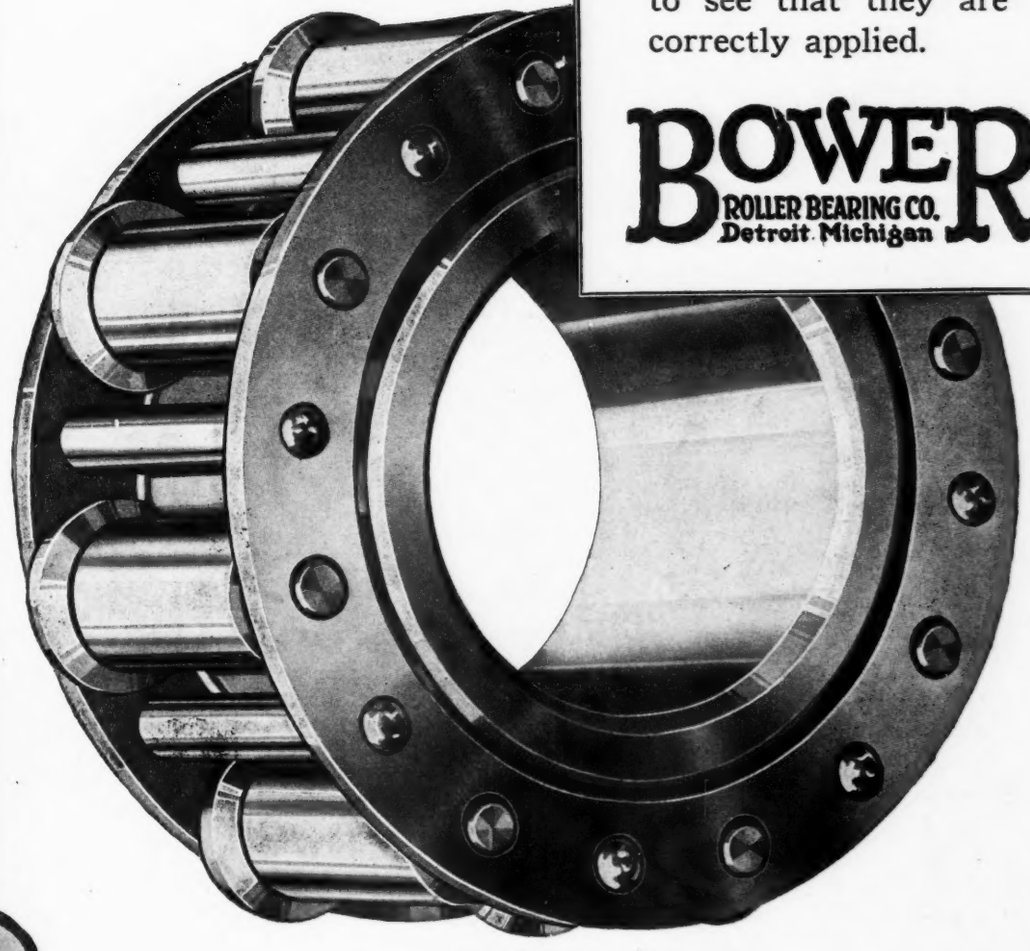

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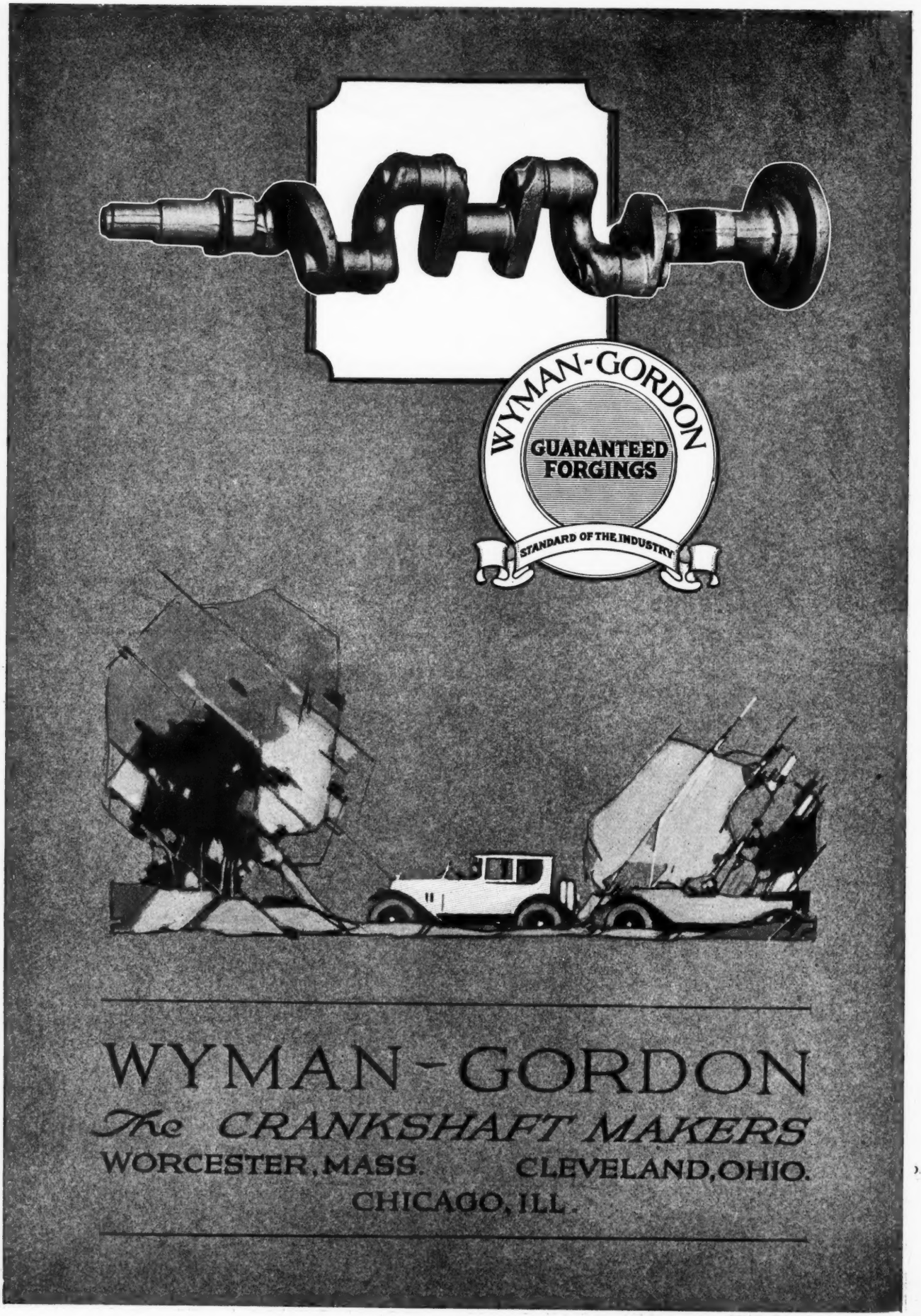
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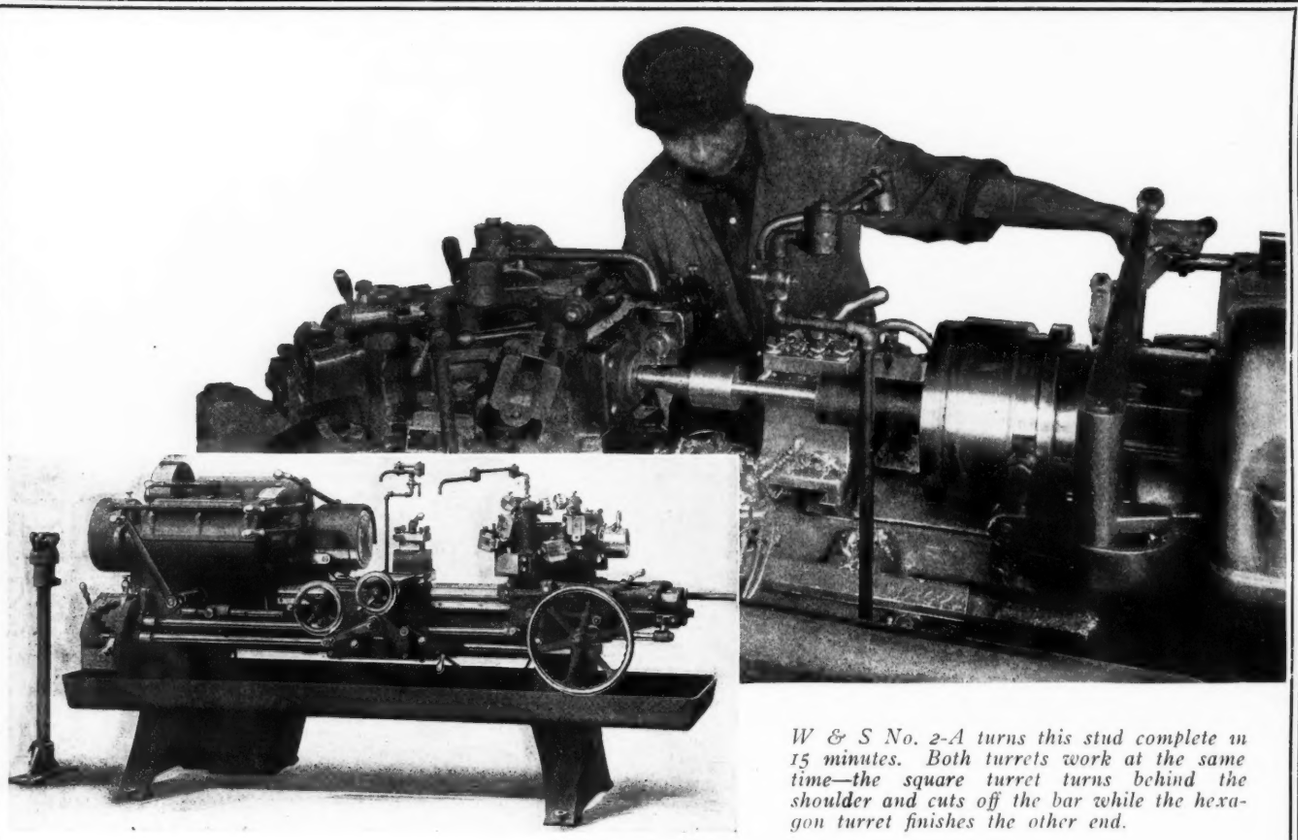

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IT is good to stretch the muscles for a new effort after the old job has been finished. It is good to let the dead past bury the past, to drop the old mistakes and the old difficulties, taking only into the present the greater experiences which will enable us to use our strength more effectively on the new job.

The old year is gone with its excited rush for goods and its slackening of effort, with its peaks and low points. The New Year is before us and will be pretty much what we make it. We have the strength, the muscles and, I believe, the intelligence and courage to build up a year of constructive progress.

We wish you a Happy New Year—industrial happiness like social happiness comes from within—The joy of accomplishment is before us industrially. Together we can secure it.

Harry Tipper

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Hy-Duty-Fans

for Automobiles - Trucks - Tractors

Standard Equipment With More Than 250 MANUFACTURERS Perform Their Duty of Cooling Motors Faithfully All Over the World

AUTOMOTIVE PARTS COMPANY

INDIANAPOLIS, U.S.A.

AT THE SHOW

Two New HEALD Machines

Style No. 55
Cylinder Grinding Machine

A self-contained grinding machine built expressly for the purpose of finishing a large variety and all sizes of work. Ideal for the regrinding of worn and scored cylinders. With its wide base and large distance between the table and the center of the grinding wheel it is highly recommended for the railroad shops and general repair work.

Device for Automatically Grinding Piston Rings

Requires only the filling of the hopper and the carrying away of the finished product in a basket. Maintains continuous maximum production without requiring skilled and experienced operator. Designed to be used with a Heald Style No. 22 Surface Grinder.

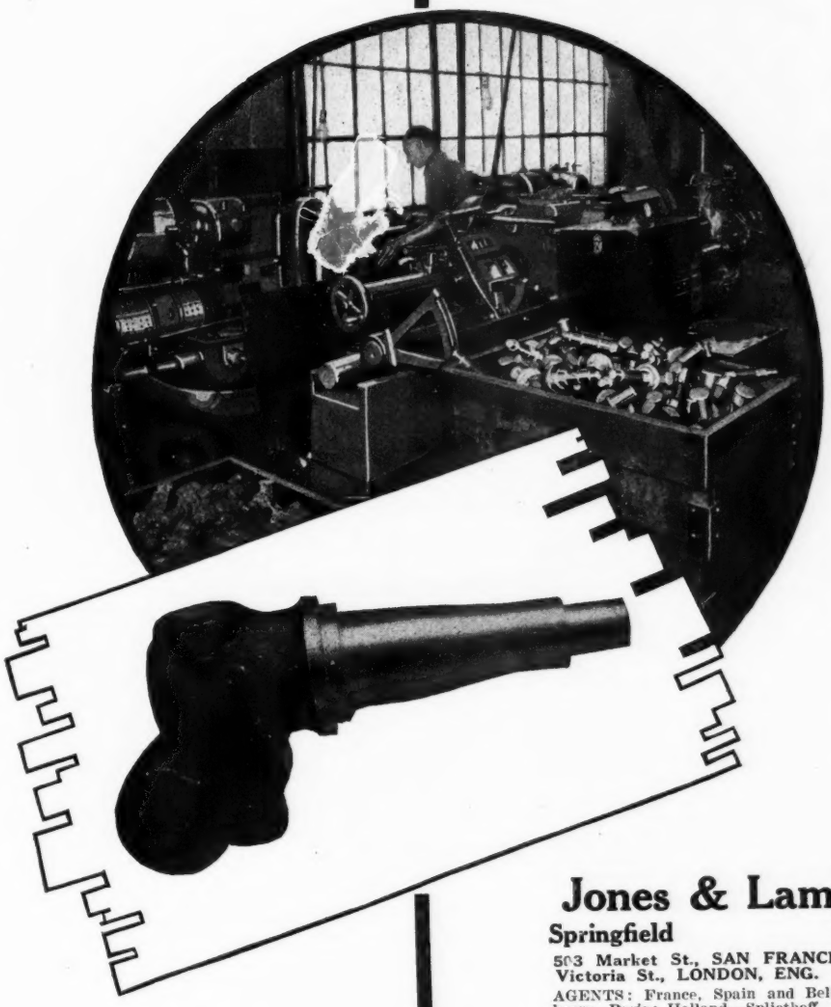
Model machines will be shown at the New York Auto Show January 8th to 15th at booths E-88 and E-89. If you cannot be there let us furnish you with information about same.

THE HEALD MACHINE CO. 11 New Bond St.

WORCESTER, MASS., U. S. A.

BRANCH OFFICES: New York, 839 Singer Bldg.; Philadelphia, 1308 Commonwealth Bldg.; Chicago, 26 South Jefferson St.; Detroit, 401 Marquette Bldg.; Cincinnati, 311 Provident Bank Bldg.; Cleveland, 721 Engineers' Bldg. WESTERN AGENTS: Eccles & Smith Co., Los Angeles, San Francisco, Seattle and Portland; Salt Lake Hardware Co., Utah and Idaho; Hendrie & Bolthoff Mfg. & Supply Co., Denver, Colo.

FAY AUTOMATIC LATHE



THE FAY Automatic Lathe is recognized as a standard machine for the handling of standardized automobile parts —pistons, hubs, gear blanks, camshafts, etc. All these parts show the same production-boosting results when turned the Fay-way that is shown on these steering knuckles, being turned out in large lots in record-breaking time at the plant of the International Harvester Company, Akron, O.

Send sample piece or blueprint of your work for time estimate.

Jones & Lamson Machine Co.

Springfield Vermont

503 Market St., SAN FRANCISCO, CAL. 9-10 Water Lane, Queen Victoria St., LONDON, ENG.

AGENTS: France, Spain and Belgium—F. Auberty & Co., 91 Rue de Mauberge, Paris; Holland—Spliethoff, Beeuwkes & Co., Rotterdam; Japan, Korea, etc.—Mitsui & Co., Ltd., Tokio; Australasia—McPherson's Pty., Ltd., 554 Collins St., Melbourne; Stockholm, Sweden—A. Bol Oscar Lindbom, Postbox 420.

The FAY-WAY of Machining Steering Knuckles

AT THE INTERNATIONAL HARVESTER CO., AKRON, OHIO

A Distinctive Product

IT is a rare case where a machine tool builder has won the distinction of being the originator of an industry devoted exclusively to one particular product.

The Gear Shaper is unique in this respect. Many of the large automobile and truck transmission manufacturers have built their business up largely on the Gear Shaper, and have been able to keep pace with the demands for a better product in larger quantities, because of the adaptability of this machine to the cutting of accurate gears in large quantities.

The machine tool builder has also greatly profited from the advantages offered by the Gear Shaper, in that he has not only been able to make his product better, but it has been possible for him to adopt various forms of so-called "special" gears that have not only simplified his product, but greatly increased its manufacturing possibilities.

In other words, the Gear Shaper has made it possible for the machine tool builder to produce a distinctive product.

The possibilities of the Gear Shaper are practically unlimited. The designer finds that this machine will not limit him in his choice of the selecton of an efficient and desirable form of gear, and new examples of favorable gear applications are constantly being adopted.

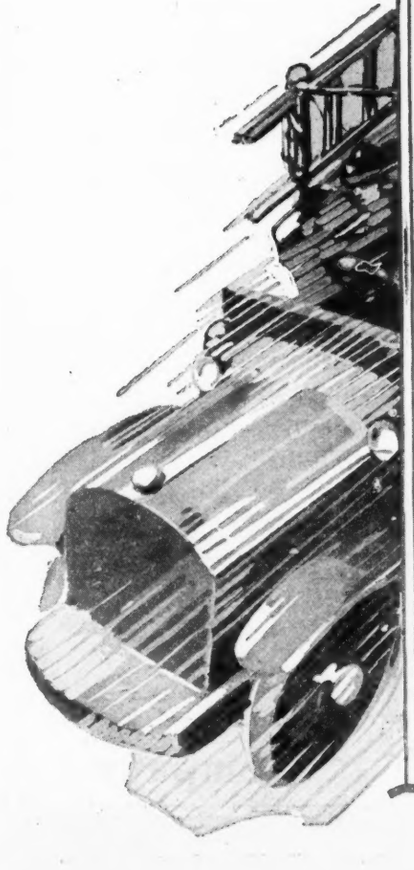
If you are interested in this subject, our booklet, "Commercial Gear Cutting," will prove of value to you.

The Fellows Gear Shaper Company

Springfield, Vermont, U. S. A.

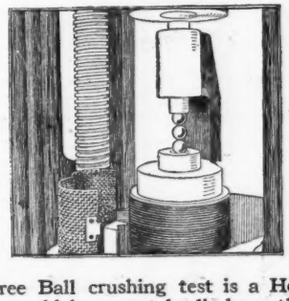
FOREIGN AGENTS: Alfred Herbert, Ltd., Coventry, England; Societe Anonyme Alfred Herbert, Paris, France; Societa Anonima Italiana Alfred Herbert, Milan, Italy; Alfred Herbert, Ltd., Yokohama, Japan; Societe Anonyme Alfred Herbert, Barcelona, Spain; Societe Anonyme Belge Alfred Herbert, Brussels, Belgium; Alfred Herbert (India), Ltd., Calcutta, India.

HOOVER STEEL BALLS



WHERE frictionless and smoothly rolling motion is essential, where unexpected loads and jolts must be withstood, designing engineers are using bearings built on Hoover balls. At any speed and in all positions the highly polished balls spin with a friction-saving freedom that is source of silence and of power conservation.

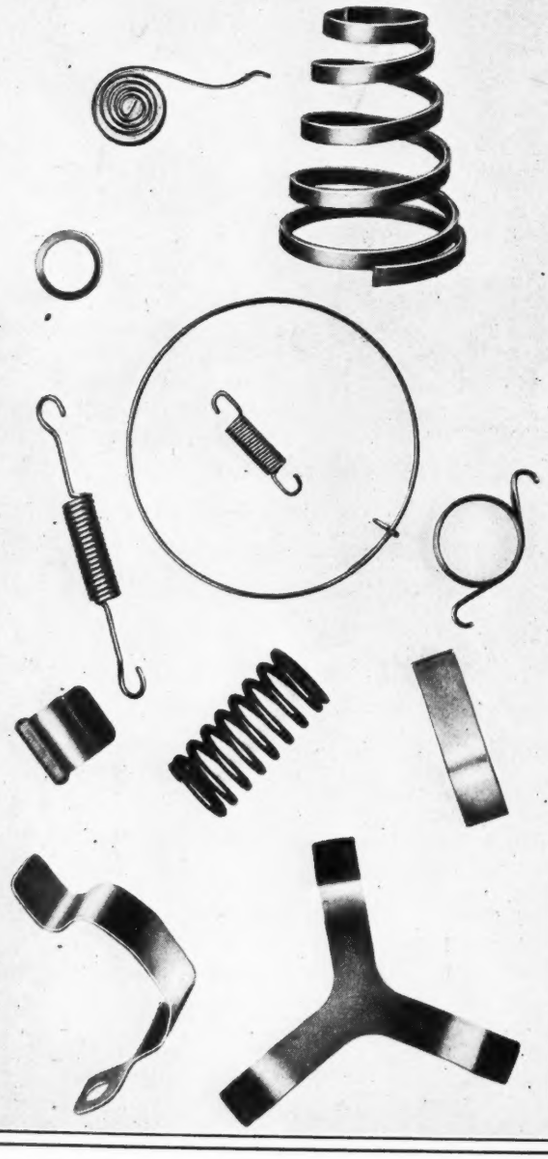
HOOVER STEEL BALL COMPANY
ANN ARBOR, MICH.



The Three Ball crushing test is a Hoover development which accurately discloses the tensile strength of any ball. It is one phase of the final super-inspection made on every lot of Hoover balls

(2)

AT THE
AUTO SHOW



SPRINGS, WIRE & STEEL
EST.
"BARNES-MADE" PRODUCTS
1857
SCREW MACHINE PRODUCTS

AT the Auto Show you are naturally watching keenly for possible new refinements in important operating parts and manufacturing methods. Some of these will very probably concern that indispensable part of every engine—Springs.

Best results will follow if you'll talk them over while they're still fresh in mind with Wallace Barnes Spring experts, who will be at the show the entire week ready to render any service or information.

Get in touch with

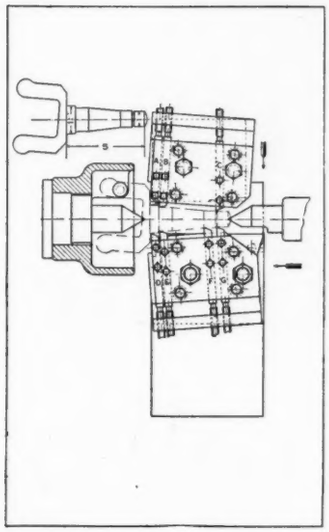
Mr. Brown Joyce
Mr. J. E. Andrew
Mr. Lyman D. Adams
Mr. William J. Black
Mr. Frank B. Tibbitts
Mr. Lisle K. Lasher

any time during Show Week at the Hotel Commodore. Just leave a message, and they will meet your convenience for appointments.

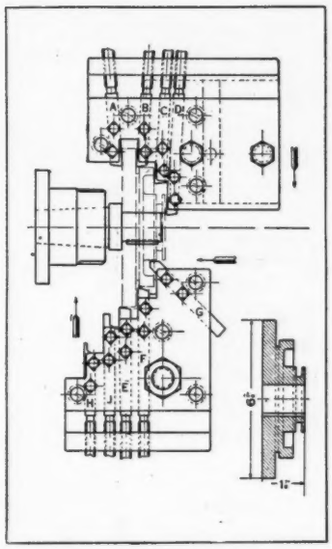
The
Wallace Barnes
Company
Bristol, Conn.

REED-PRENTICE COMPANY

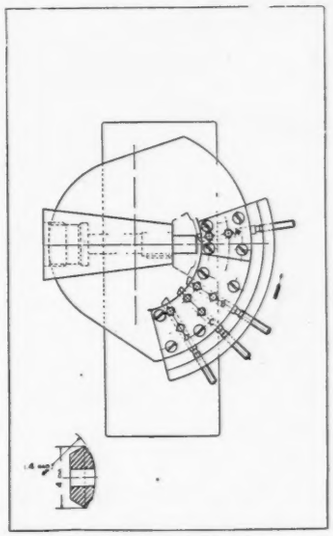
WORCESTER MASS. U.S.A.



Front Wheel Spindle

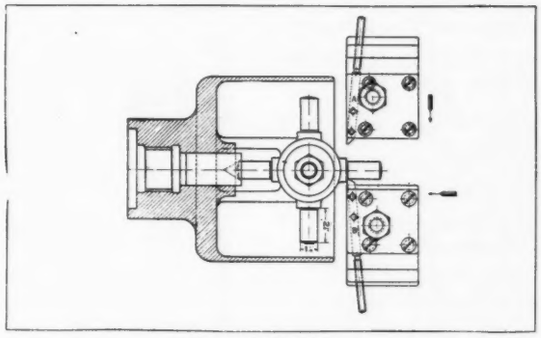


Transmission Gear



Differential Bevel Gear

A 16-PAGE PAMPHLET EXPLAINING THIS LATHE IN DETAIL WILL BE GLADLY SENT ON REQUEST.



Differential Spider

SEND US BLUE PRINTS OR SAMPLE FORGINGS OR CASTINGS WITH B/P AND WE WILL BE PLEASED TO SEND ESTIMATES AND TYPE OF MACHINE BEST SUITED FOR THE WORK.

CAN WE HELP?

HERE ARE SHOWN TOOL SET-UPS TO PERFORM THE ROUGH AND FINISH TURNING OPERATIONS ON PIECES THAT PROBABLY ARE SIMILAR TO THOSE MANUFACTURED BY YOU.

REED-PRENTICE SEMI-AUTOMATIC LATHES HAVE BEEN SOLD BY THE THOUSANDS DURING THE LAST FEW YEARS AND WE CAN, BY OUR LONG EXPERIENCE, SHOW YOU WAYS AND MEANS TO CUT THE COST OF YOUR PRODUCTION.

LET US SUBMIT TIME ESTIMATES OR DAILY PRODUCTION FIGURES THAT ARE NOT RIDICULOUS BECAUSE ONLY THE CUTTING TIME OF THE TOOL IS CONSIDERED—BUT ESTIMATES ON THE PRODUCTION OF A NORMAL HEALTHY MAN, DAY IN AND DAY OUT, USING A REED-PRENTICE.

TEST OUR SERVICE

REED-PRENTICE COMPANY

Main Office: 53 FRANKLIN ST., BOSTON, MASS.

BRANCHES:

BUFFALO	CHICAGO	CLEVELAND	DETROIT	INDIANAPOLIS	NEW YORK	PHILADELPHIA
Asso. Service Bldg.	28 N. Clinton St.	408 Frankfort St.	Kerr Bldg.	940 Lemcke Annex	Grand Central Palace	514 Liberty Bldg.

Chisholm-Moore

Hoists Cranes Trolleys

It's the Unusual that Counts

MANY tire shops spend a lot of valuable time lifting and tugging on big tires, but this up-to-date shop installed a "Cyclone" Hoist and "Matchless" Trolley and greatly increased their production—and profits.

How many places are there in your plant where a gang of men spend their time doing useless lifting and tugging?

It might be a mighty good thing for you to call one of our sales-engineers and with him go over your plant. Any suggestion he may make will be for our mutual benefit, as we realize that we can hope to win your continued orders only by rendering service and satisfaction to you.

Better drop us a line today, there's an era of stiff competition at hand, and he who gets his production UP and his costs headed DOWN is going to be the one who gets the business.

The Chisholm-Moore Mfg. Co.
Cleveland, O.

Branch Offices:

30 Church Street
NEW YORK

Peoples Gas Bldg.
CHICAGO

Henry W. Oliver Bldg.
PITTSBURGH

David Whitney Bldg.
DETROIT

NOTE THE WOOD WHEELS EVERYWHERE

For the life of the Car

Wood Wheels manufactured by the members of the Automotive Wood Wheel Manufacturers' Association are guaranteed for the life of the car on which they are placed.

This is a remarkable obligation. Wood Wheels are working units. They must withstand unnumbered road jolts and side-thrusts. Still, by the terms of this guarantee they are pledged to outlive other parts that their resiliency actually protects from the shocks of service.

This guarantee sets forth, as nothing else could, the degree of perfection that has been attained in the construction of Automotive Wood Wheels. It expresses the faith that the makers of Wood Wheels have in their product. And it supplies a new and even greater reason why Wood Wheels will continue to be featured as standard equipment on the world's best cars.

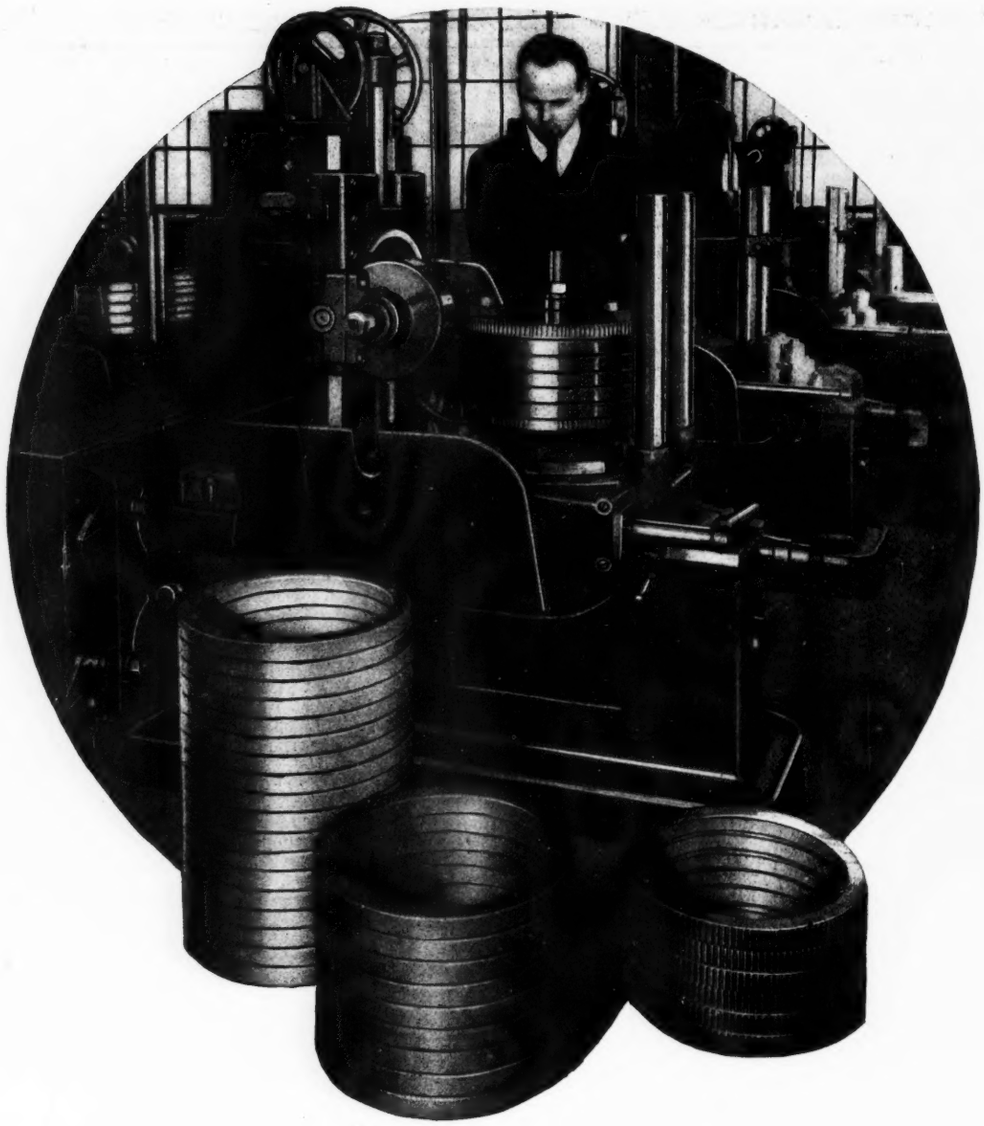
AUTOMOTIVE WOOD WHEEL MANUFACTURERS' ASSOCIATION
105 West Monroe Street Chicago, Illinois

WOOD WHEELS for MOTOR VEHICLES

For the good of the industry, the Automotive Wood Wheel Manufacturers' Association is endeavoring to achieve Hub Standardization.

Members of this Association guarantee Wood Wheels of their manufacture for the life of the car or truck on which placed.

Automotive Wood Wheel Manufacturers' Association



G & E Hobbing Machines

Cutting Fly Wheels

Let Our Engineering Department Serve You

GOULD & EBERHARDT

"HIGH DUTY" SHAPERS
AUTOMATIC GEAR AND RACK CUTTING MACHINERY

ESTABLISHED 1833 NEWARK, N.J. U.S.A.

Building Pumps With the aid of Air Tools

LIKE most industries the modern pump making plant depends upon air tools to no small extent for economical and rapid production.

Sand Rammers are used to tamp the molds, Air Motor Hoists to handle them and Chipping Hammers and Grinders to trim and clean the castings; air drills and reamers are used extensively in the machining process; and the assembly finds air tools at work seating studs, running up nuts and performing many other operations in a most efficient manner.

Air tools will help **your** production, and you will be well repaid for investigating them. Write to the nearest branch office listed below; you will receive a service that starts with a careful study of your problems and ends only when you cease using tools.

When you write, ask for Catalog 8000

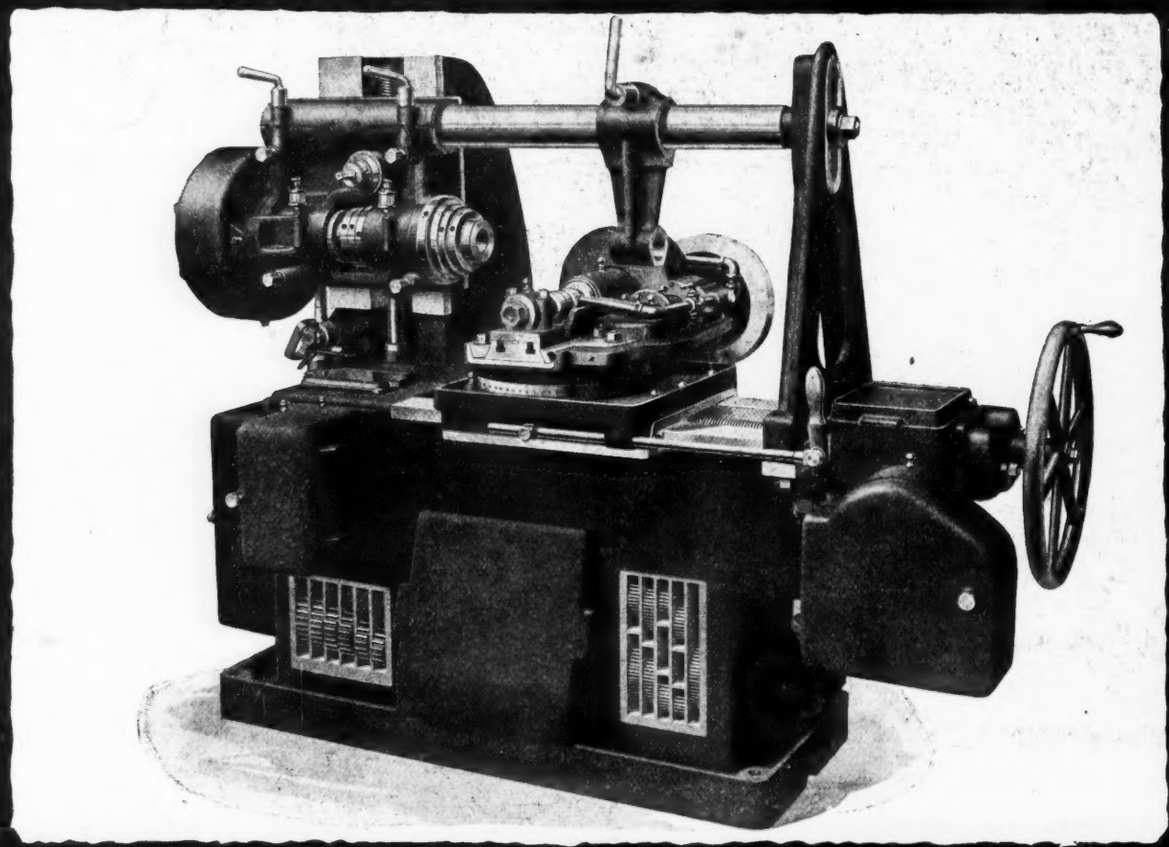
INGERSOLL-RAND COMPANY

11 Broadway **NEW YORK**

Branch Offices the World Over

148-PT

Little David AIR TOOLS



BARBER-COLMAN

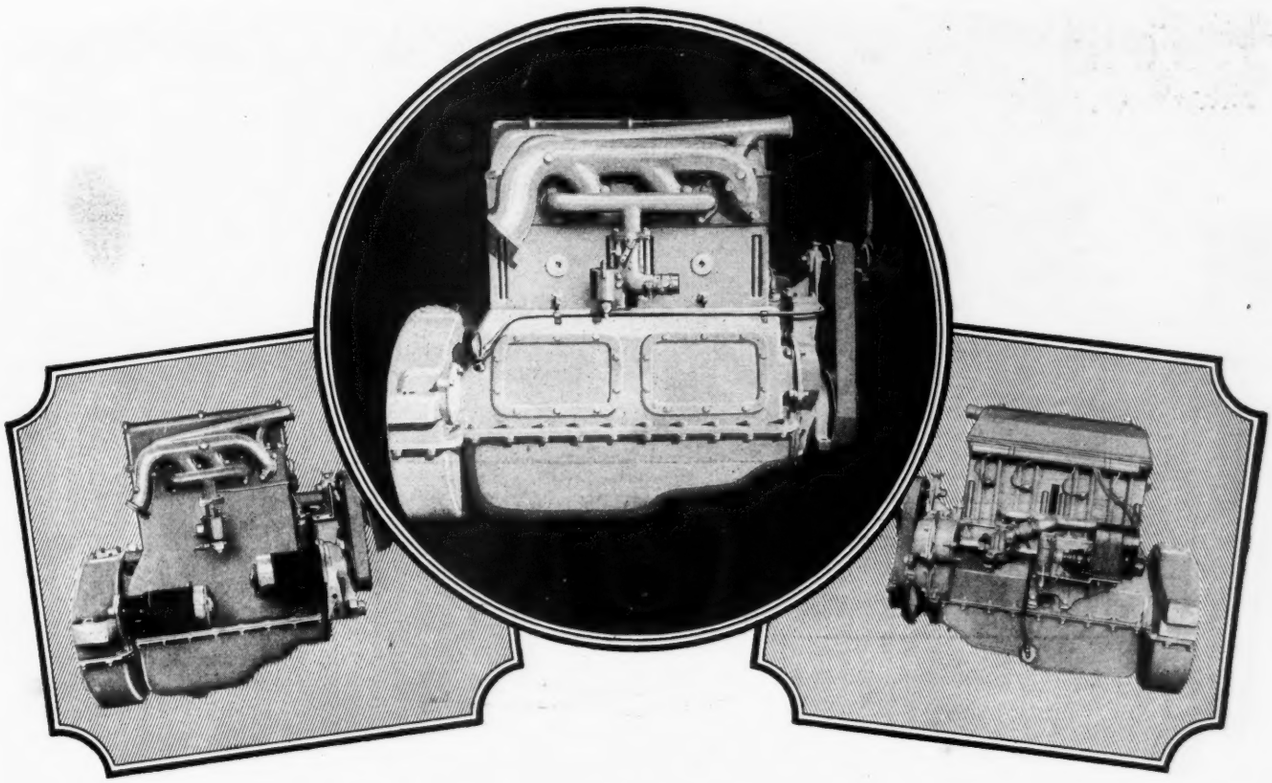
Gear Hobbing Machines

for spur and spiral gears

In continuous operation, producing accurate, quiet running gears THE BARBER-COLMAN HOBBING MACHINE cannot be excelled.

Spur and Spiral Gears, Spline Shafts and Sprockets of the highest degree of accuracy are also produced on our machine.

BARBER-COLMAN COMPANY
Rockford, Ill., U. S. A.



Model 408-3⅝ x 5″ Model 400-4½ x 6″ Model 402-4⅛ x 5¼″

Forget Bore and Stroke and Buy Engines that Sell on Performance

Study This Record of Midwest Engine Performance

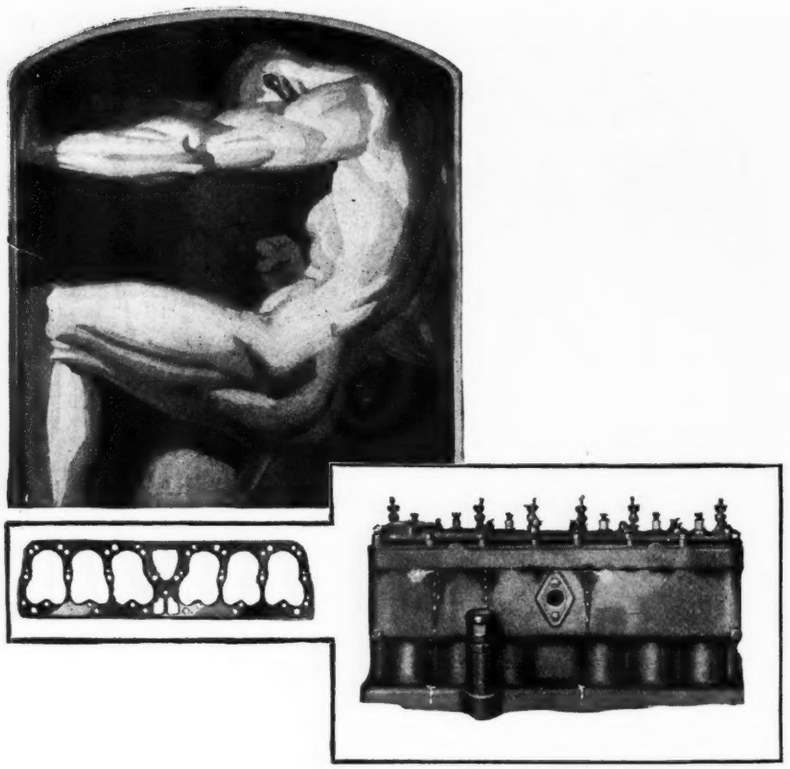
Model 408 4 Cyl. 3⅝ x 5″			Model 400 4 Cyl. 4½ x 6″			Model 402 4 Cyl. 4⅛ x 5¼″		
R.P.M.	H.P.	Torque	R.P.M.	H.P.	Torque	R.P.M.	H.P.	Torque
500	11	116 lbs. ft.	400	17.5	233 lbs. ft.	400	13	171 lbs. ft.
600	13.5	118 lbs. ft.	600	28.5	249 lbs. ft.	600	20.5	179 lbs. ft.
800	19	125 lbs. ft.	800	37.5	246 lbs. ft.	800	27.5	181 lbs. ft.
1000	25	130 lbs. ft.	1000	46	243 lbs. ft.	1000	34	179 lbs. ft.
1200	29	127.5 lbs. ft.	1200	53	234 lbs. ft.	1200	40	175 lbs. ft.
1400	33	124 lbs. ft.	1400	59	222 lbs. ft.	1400	45	169 lbs. ft.
1600	36	118 lbs. ft.	1500	61	213 lbs. ft.	----	----	---------
1800	39	114 lbs. ft.	1600	----	---------	1600	47.5	156 lbs. ft.
			1800	----	---------	----	----	---------

Note TORQUE in each case. All tests made on Standard Sprague dynamometers having 21 inch arm radius. Gasoline as fuel. Installation prints and complete specifications will be sent on request.

MIDWEST ENGINE COMPANY :: Indianapolis, U. S. A.

MIDWEST

TRUCK *and* TRACTOR ENGINE



Small illustration shows what happens when inferior gaskets are used.

Note to Repair Men: The best engineering authorities specify that a new gasket be used each time the motor head is removed. By doing this you insure against oil, water, and compression leaks, and add an extra profit to every job.

Victor Gaskets Hold Compression

Victor copper asbestos cylinder head gaskets withstand the terrific pressure caused by the explosion in the cylinders.

The power is confined and directed to the driving parts without loss.

Victor gaskets are accurately made of the best materials by skilled workmen to hold this compression under all conditions.

In the Victor line there are nearly 400 types of cylinder head gaskets and more than 4,000 other types.

Jobbers and dealers thus have at their command a complete assortment for every motor need.

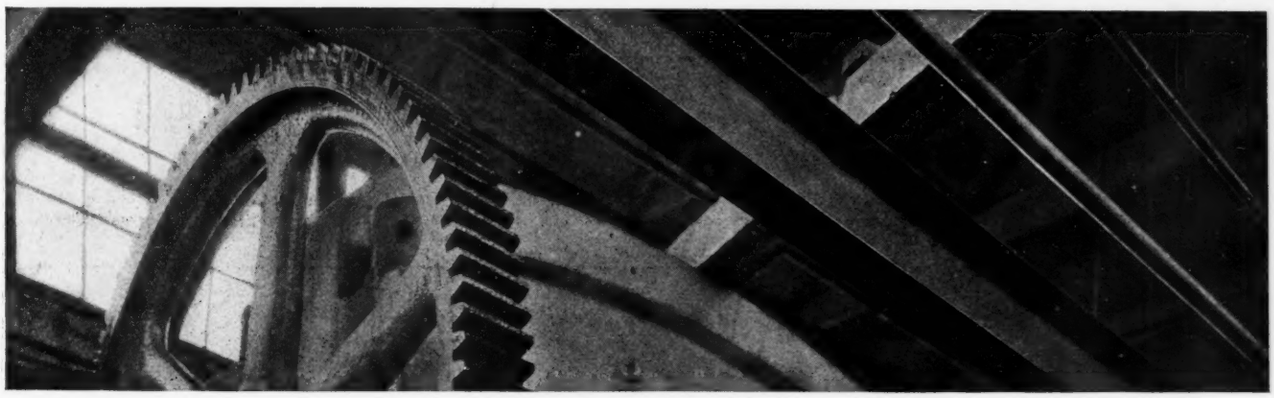
VICTOR MANUFACTURING & GASKET CO.

World's Largest Gasket Manufacturers

5750 Roosevelt Road - CHICAGO, ILLINOIS

The Worlds Standard Gaskets

VICTOR
COPPER-ASBESTOS
GASKETS



The Bossert Engineering Department Brings Bossert Equipment to the Very Doors of Your Own Plant

Bringing Bossert Production to you is something new in the field of co-operative endeavor.

Bossert engineers come to you with their knowledge, skill and experience—they place Bossert manufacturing facilities at your disposal. But they go further than this.

Every pressed metal job has a different phase—a different angle. When the Bossert Man comes to your plant he brings with him an intimate knowledge of these different problems—and before he goes you can rest assured that you have received the best possible counsel.

Next time have your parts made the Bossert way—send for our engineers, without any obligation on your part.

The Bossert Corporation, **Main Office and Works, Utica, N. Y.**

Branch Offices:

Cleveland, Ohio, 611 Citizens' Bldg. Detroit, Mich., 1513 Ford Bldg. New York City, 30 Church Street.

MILTON

With Complete Machining Service

THE MARK OF A GOOD CASTING

The Point of Contact

WHEREVER your plant is located there is a Milton Man within call.

While his mission is to serve and sell, he is more than a service man, more than a salesman. To the user of Milton Service he is a metallurgical expert, foundry foreman and mechanical superintendent, in that he serves in the capacity of all three. His is a personal service, the point of contact between your organization and the Milton Service he represents.

Your casting problems become our problems, through him. Your machining difficulties are ours to solve, through him. Our extensive facilities for the production of electric steel castings and the machining of them, when desired, are placed at your disposal, through him.

Your request to our main offices places him, his knowledge and the service he represents at your elbow.

Milton deliveries are exceptional

Electric Steel Plant

Milton Manufacturing Company
Milton Penn.
U. S. A.

There's a MILTON

ELECTRIC STEEL CASTINGS

MAN in Your Vicinity

SPARTON
MOTORHORNS

Public Square
Cleveland

Sparton Motorhorns Mean Safety for Motorists

Motorists whose cars are equipped with Sparton Motorhorns, drive with a feeling of safety in the most congested traffic or over tree-lined country roads.

They know their Sparton will not fail to send its peremptory warning when called upon to do so.

It is this desire for safety that has impelled many car drivers to remove the stock horns from their machines and replace them with the reliable Sparton.

Sparton Motorhorns are so honestly made that their service is measured in years, and it is this same honest construction that assures their functioning at all times.

The worth of Sparton Motorhorns, Sparton Fans and Radiators and Sparton Fuel Feeders has resulted in their being chosen as standard equipment on many of America's best cars.

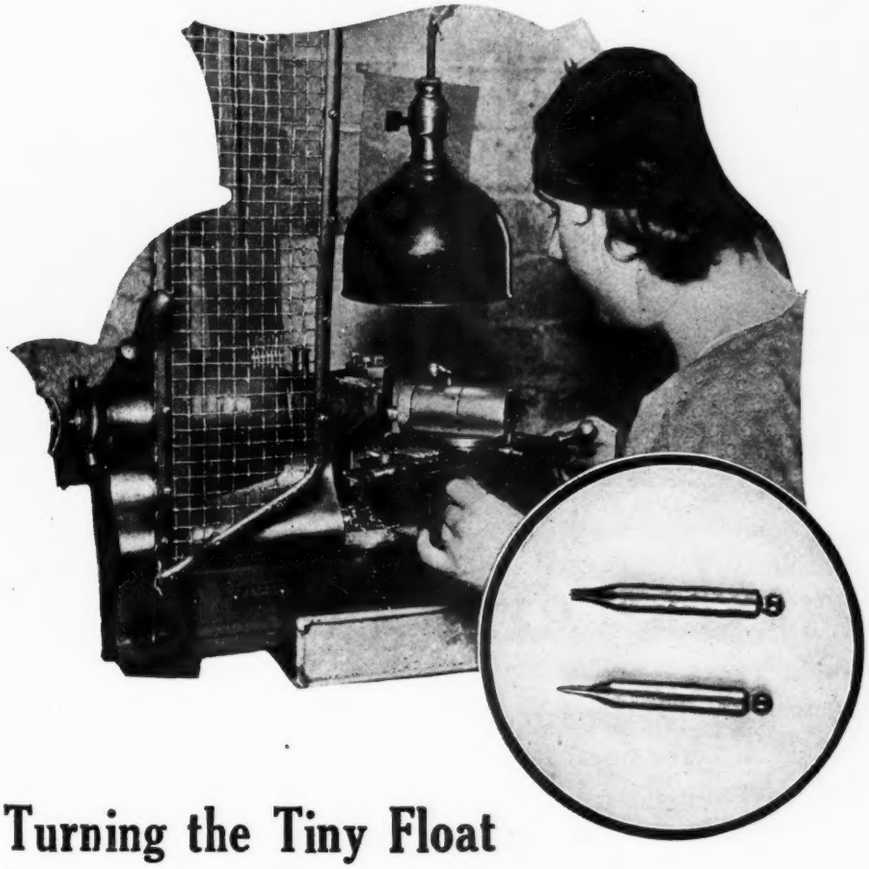
SAFETY FIRST SOUND SPARTON

The Sparks-Withington Co. **Jackson, Michigan** (206)

FIRST CHOICE OF AMERICA'S BEST CARS

RIVETT SERVICE

insures the profitable performance of Rivett Products from the day they enter your shop.



Turning the Tiny Float Valves of a Marvel Carburetor

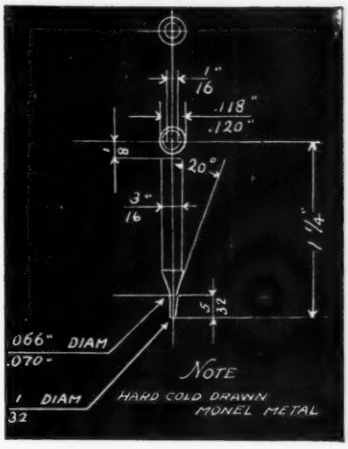
The piece—a Monel Metal float valve for a Marvel Carburetor. The job—the finishing of this very small unit to .002″ limits.

You have the indisputably clean-cut, precise performance of a Rivett No. 504 Precision Bench Lathe. And the results from the operation prove the superiority of this Rivett product for the very sensitive task put up to it.

A woman's delicate, careful handling guides the work to its accurate finish. The production is so steady and so great as to seem out of place on a job so exacting. And yet, a skilled operator at the right Rivett machine insures results most satisfying.

You should know the world-famed line of Rivett precision bench lathes in detail. Their possibilities, in the tool room and on the manufacturing floor, are many and profitable. Send to our nearest dealer for literature or information in selecting the right machine for the job.

Know Rivett Machines and Profit By Their Use



RIVETT No. 505

Plain Precision Bench Lathe

Capacity—swings 8″ diameter, takes 19″ between centers.

Capacity for bar stock through head, ⅞″ diameter.

RIVETT LATHE *and* GRINDER COMPANY

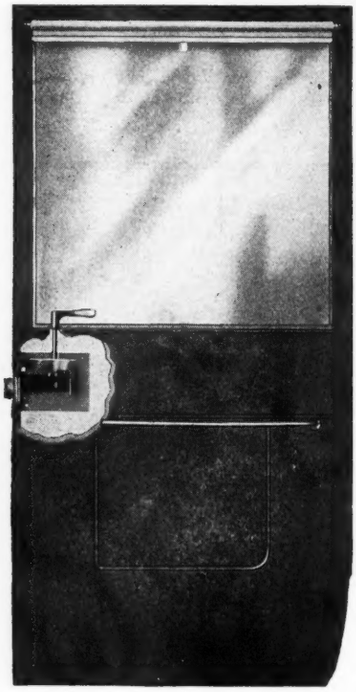
BRIGHTON DISTRICT *of* BOSTON, MASSACHUSETTS

"MAKERS OF THE WORLD-KNOWN RIVETT PRECISION LATHE"

LIST OF AGENTS

DOMESTIC AGENTS: The Fairbanks Company, Boston, Mass., Providence, R. I., New Orleans, La., Birmingham, Ala.; Purinton & Smith, Hartford, Conn.; Patterson, Gottfried & Hunter, Inc., New York City; Homer Strong, Rochester, Buffalo, Syracuse and Albany; D. Nast Machinery Co., Philadelphia, Pa.; Somers, Fitler & Todd Co., Pittsburgh, Pa.; Cleveland Tool & Supply Co., Cleveland, Ohio; J. R. Stone Tool & Supply Co., Detroit, Michigan; E. A. Kinsey Company, Cincinnati, Ohio, Indianapolis, Ind.; Dale-Brewster Mchry. Co., Inc., Chicago Ill.; Blackman-Hill-McKee Machinery Co., St. Louis, Mo.; Portland Machinery Company, Portland, Ore.; Hallidie Machinery Co., Seattle, Wash.; F. O. Stallman Supply Co., San Francisco, Los Angeles, Cal.; F. E. Satterlee Co., Minneapolis, Minn.; Peden Iron & Steel Co., Houston, Texas; Smith-Courtney Co., Richmond, Va. FOREIGN AGENTS: H. W. Petrie, Ltd., Toronto, Ont., Can.; Williams & Wilson, Ltd., Montreal, Can.; Fenwick Freres, Paris, France, Belgium, Switzerland, Italy, Spain, Portugal; Buck & Hickman, Ltd., London, Glasgow, Manchester, Sheffield, Birmingham; Benson Brothers, Sydney, Australia; Yamatake Co., Tokio, Japan.

E&M



A single, easy motion — a quarter-turn of the handle — both unlocks and opens the door.

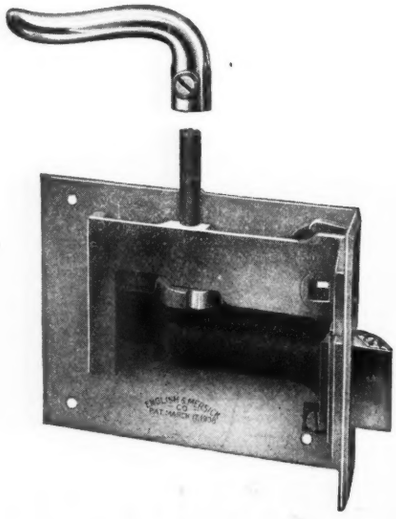
The Rotary Lever Lock will be exhibited at the New York Show — spaces D98-99, Fourth Floor, Grand Central Palace.

ENGLISH & MERSICK

Rotary Lever Lock

E&M

Visible on Every Lock



NOW standard equipment on many of the finest motor cars. It is the choice of the body designer on the double basis of utility and beauty.

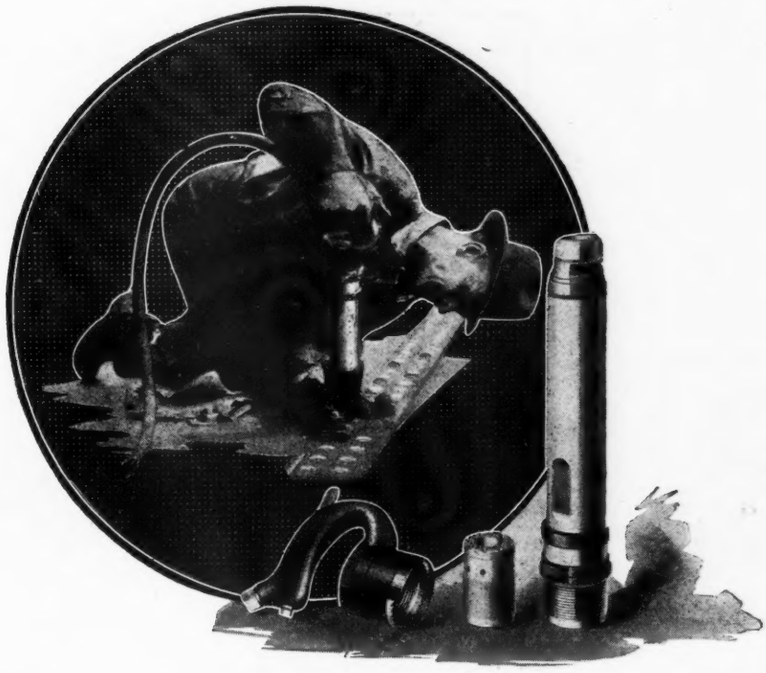
There's no unsightly slot in the finishing rail or inside upholstery of the door equipped with this lock. Its simple, easy action and substantial construction appeal to the car buyer of discrimination. It denotes that the car is the product of a manufacturer who considers quality and service first.

Rotary Lever Locks add a selling point to the car's value—and a talking point to the distributor's argument.

The ENGLISH & MERSICK CO.
New Haven, Conn.

Since 1860 makers of fine body hardware

Locks Hinges Handles



Why Boyers have three unit parts

GOOD to the last part defines the patented three-unit construction of Boyer Riveting Hammers. Each part is *separately* renewable and interchangeable with hammers of a like type.

Low upkeep costs prove the Boyer design logical, simple, dependable. Fewer than three unit parts increases maintenance costs, because the breakage or undue wearing of a major part then necessitates scrapping adjoining parts still serviceable.

Sustained, efficient service describes Boyer materials and workmanship. Boyer valves, for example, due to correct heat treatment, are *durable.* Boyer valve cases, by a simple reaming operation and the use of oversize valves, have *five lives!*

There's no other pneumatic hammer just like the Boyer. And Boyers, in a complete line, are obtainable from stock at Company Branches.

Ask for Boyer Hammer Bulletin 600.

Chicago Pneumatic Tool Company

Chicago Pneumatic Building · 6 East 44th Street · New York

*Sales and *Service Branches all over the World*

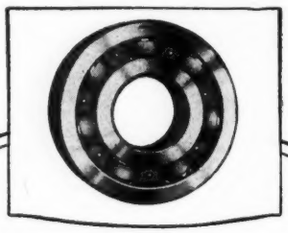
*Birmingham *Boston *Buffalo *Chicago *Cincinnati *Cleveland *Detroit El Paso Erie Franklin Houston Joplin *Los Angeles *Minneapolis *New Orleans *New York *Philadelphia *Pittsburgh *Portland Richmond Salt Lake City *San Francisco *Seattle *St. Louis Barcelona *Berlin Bombay Brussels Buenos Aires Cadiz Christiania *Fraserburgh Havana Honolulu Johannesburg Lisbon *London Madrid Milan *Montreal Osaka *Paris Seoul Tokyo Toronto Vancouver Winnipeg

P 73

BOYER PNEUMATIC HAMMERS··LITTLE GIANT PNEUMATIC AND ELECTRIC TOOLS
CHICAGO PNEUMATIC AIR COMPRESSORS··VACUUM PUMPS··PNEUMATIC HOISTS,
GIANT OIL AND GAS ENGINES ROCK DRILLS ·· COAL DRILLS

BOYER HAMMERS

The world's standard *wherever rivets are driven*



Strom radial bearing

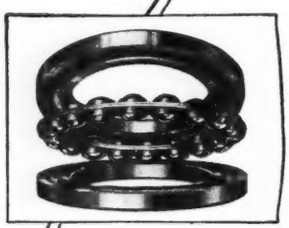
We Make a Complete Line of Ball Bearings for All Applications

Strom radial, thrust, and angular contact bearings are made in a wide range of sizes for use *wherever a shaft turns.*

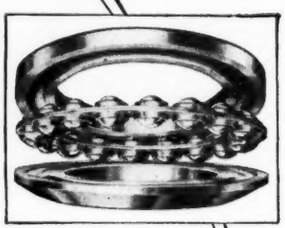
With our complete equipment we are able to give prompt deliveries on bearings for automobiles, trucks, tractors, and all types of machinery.

Our large staff of engineers is always at your service to help select and design the correct bearings for your needs.

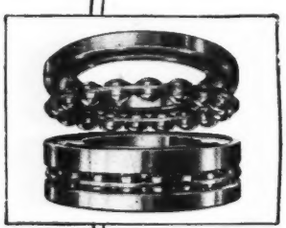
Angular contact bearings especially designed to support combinations of radial and heavy end thrust loads.



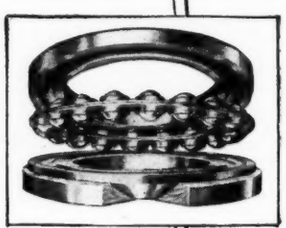
Single acting thrust bearing with flat seats (grooved races). 1100F Series



Single-acting, self-aligning thrust bearing. 1100 Series

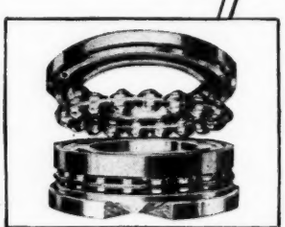


Double-acting thrust bearing, flat seats. 2100F Series



Single-acting, self-aligning thrust bearing with leveling washer. 1100U Series

Double-acting self-aligning thrust bearing. 2100 Series



Double-acting self-aligning thrust bearing with leveling washers. 2100U Series

U. S. Ball Bearing Mfg. Co.
(Conrad Patent Licensee)
4535 Palmer St. Chicago, Ill.

Strom BEARINGS

(97)

When a prominent manufacturer

TRADE T-P MARK

adopts a special tool, it is admitted that he may be saving money and time in his manufacturing processes.

When most of the prominent manufacturers

adopt and use Martell Reamers—such a consensus of opinion is unequivocal proof of their economy and efficiency.

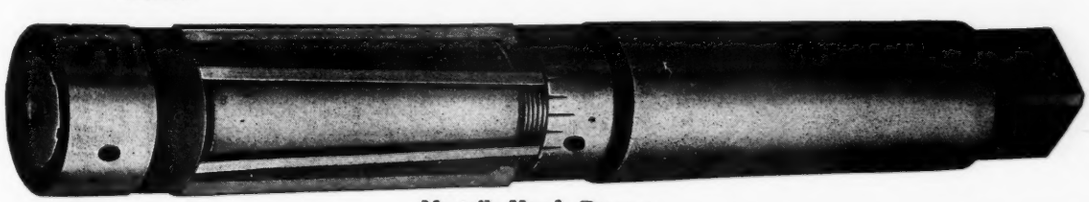
Martell Reaming System

is used by Packard, Locomobile, Chandler, Oldsmobile, Lincoln, White and other automotive manufacturers—effecting a considerable saving in bearing fitting and finishing time—as well as producing equal if not better results than by hand.

The Martell Reaming System also includes adjustable reamers for use on machine tools (for reaming and finishing dead end holes to size) as well as adjustable hand reamers for reaming connecting rod bearings, and accurate holes in machinery for studs, bolts or pins.

T. P. Bulletin 101L fully describes Martell Reaming System. Ask for a copy.

Martell Machine Reamer



Martell Hand Reamer

Martell Alignment Reamer

THE TAFT-PEIRCE MFG. COMPANY

WOONSOCKET T-P RHODE ISLAND, U.S.A.

TRADE MARK

New York—Woolworth Building Chicago—First National Bank Building. Detroit—Majestic Building.

TAFT-PEIRCE PRODUCTS CARRIED IN STOCK BY Syracuse Supply Co., Syracuse, Buffalo, Rochester; Cadillac Tool Co., Detroit; Sherritt & Stoer Co., Philadelphia; Wm. M. Partoun Supply Co., Cleveland; Northern Machinery Co., Minneapolis; Mid-West Machine & Tool Supply Co., Davenport, Iowa.

2126

Victor
TRADE MARK
Lamps

The designing of automotive lamps is a distinct science, an art unto itself—its requirements are exacting, demanding thorough understanding and specialized skill.

For more than a generation The Corcoran-Victor Company has applied the accumulated experience of decades to automotive problems.

The result is the perfected Victor Lamp of today, a lamp which meets every automotive engineering need.

But at the age of 80 this organization has not ceased to grow; it does not regard its work finished.

And in this progressive spirit America's pioneer lamp-builders are prepared to approach your automotive illuminating problems; to adapt their experience and their technical skill to your requirements.

Call upon them today—they are men of constructive ideals to whom service is a privilege.

The Corcoran-Victor Company

710 Reading Road, Cincinnati, Ohio

VICTOR LAMPS FOR MOTOR CARS, TRUCKS, MOTORCYCLES, TRACTORS AND AIRPLANES

Williams' Superior Drop-Forged Wrenches

The kind of a man with that kind of an arm wants that kind of a wrench—a Williams'.

"Drop-Forged Wrenches" and "Williams" are synonymous. Good men want good tools, and the best of them are satisfied with Williams' Wrenches. Machinists everywhere have been using them for nearly half a century.

40 STANDARD PATTERNS
IN STOCK, IN 1000 SIZES

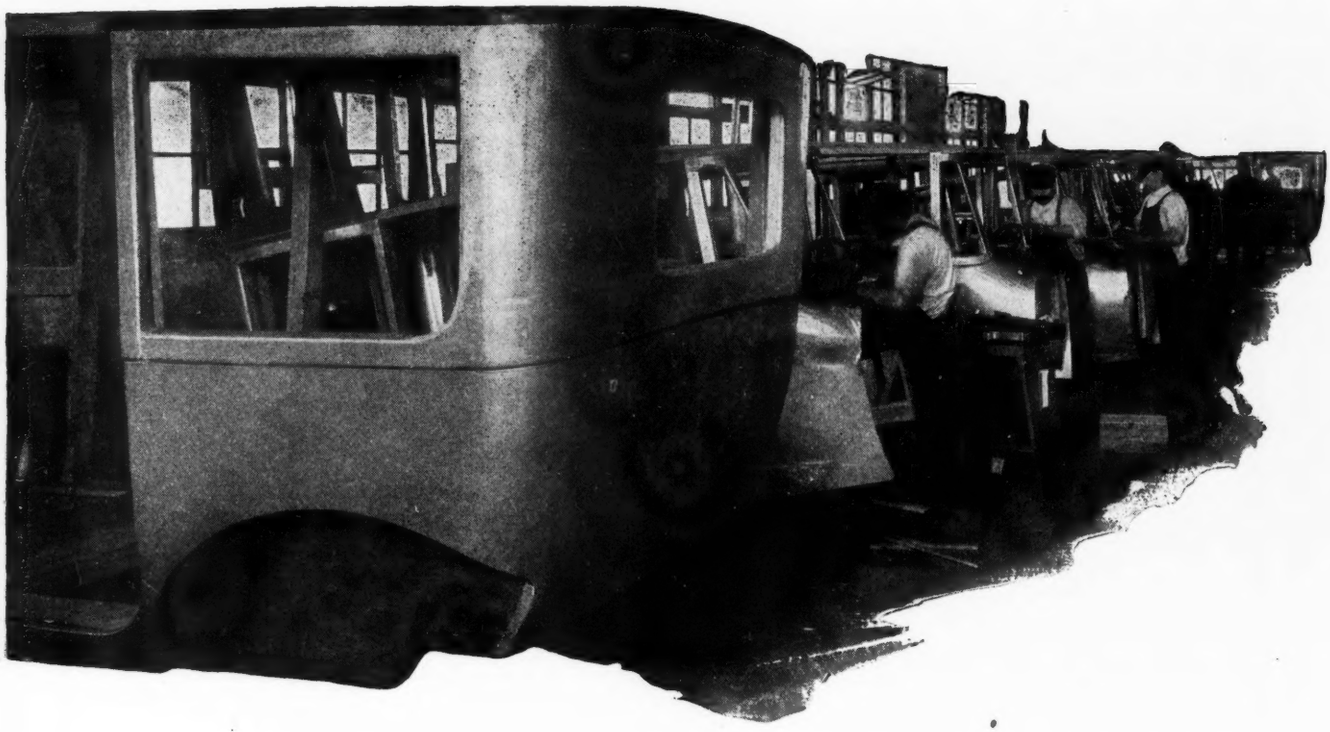
Write for Wrench Book

J. H. Williams & CO.

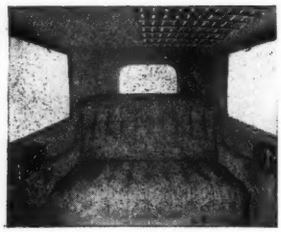
"The Wrench People"

BROOKLYN 10 Richards St.
BUFFALO 10 Vulcan St.
CHICAGO 1010 W. 120th St.

ST. CATHARINES, ONT., CANADA



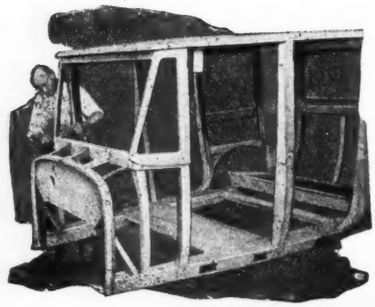
A Unique Service in Body-Building



Body-design, body-construction and body-mounting are engineering problems demanding long and intensive experience if errors and pitfalls are to be avoided. *Knowing what not to do* ranks in importance with *knowing what to do.*

The Raulang organization will bring to your problems a thoroughly-rounded experience which qualifies it to co-operate with you as a special department shouldering the responsibility for your enclosed body work.

Raulang engineers are qualified to create new but wholly practical designs, censor and revise faulty construction-proposals, advise as to best methods of mounting, keep you informed as to trends of style in foreign bodies, aid you in selecting those features and accessories which most notably influence sales, and, in every other detail, serve as authoritative counsellors on enclosed body-problems.

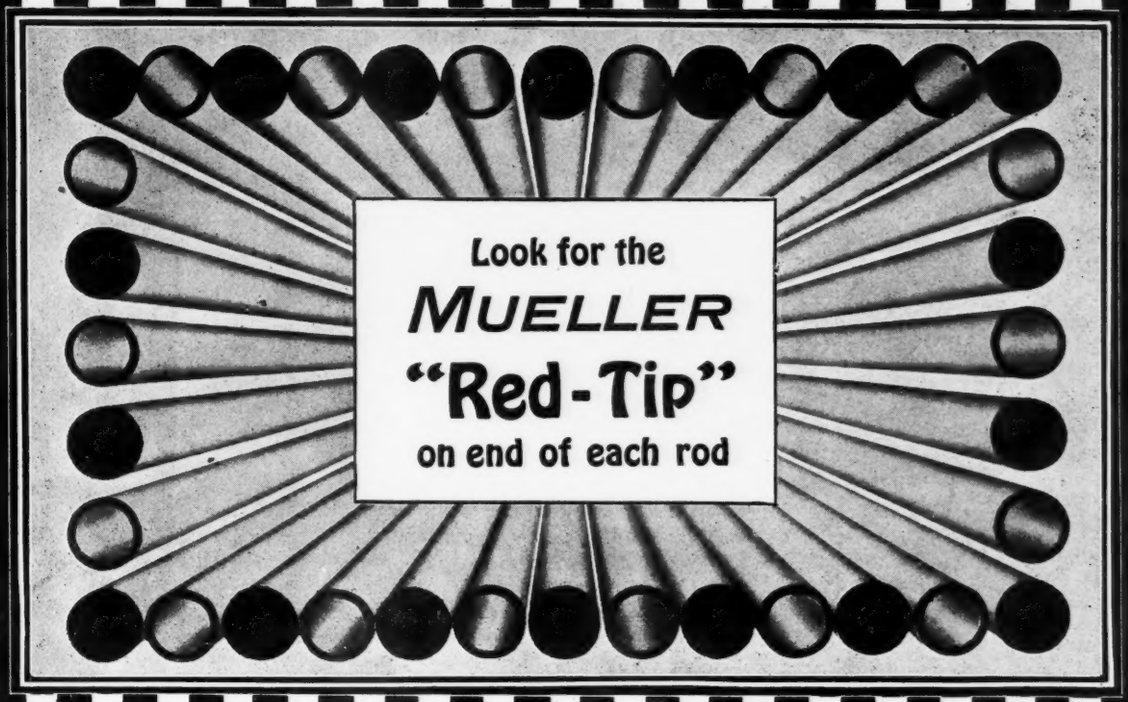


More than sixty years of coach-building experience, of which nearly twenty were devoted to enclosed body work for our own complete-car production, give Raulang engineers a unique understanding of a customer's needs and problems.

RAULANG BODY DIVISION

The Baker R & L Co.

CLEVELAND, OHIO, U.S.A.



Mueller "Red-Tip" Brass Rod

For three generations *MUELLER* Brass Products have stood all tests, and today, *MUELLER* is still the acknowledged authority on Brass – the foremost manufacturer of Brass Products in America.

Mueller Brass Products

***MUELLER* "Red-Tip" Brass Rod is made by the extrusion process—with a chemical laboratory test of every heat before extrusion, thus insuring uniform and standardized quality.**

Write for price list and detailed information.

MUELLER METALS CO., PORT HURON, MICH.

Makers of "Red-Tip" Brass Rod; Brass and Copper Tubing; Forging and Castings in Brass, Bronze and Aluminum; Die Castings in White Metal and Aluminum; also Screw Machined Products.

H. Mueller Manufacturing Co., Decatur, Ill., and Sarnia, Ont.
Makers of Water, Plumbing and Gas Brass Goods and Tools.

YOUR motor doesn't give its best when chilled by Wintry blasts—much less will it do so if the oil in the crank case is a frozen mass, which happens to many oils otherwise good. Battery, bearings, cylinders, all suffer from lack of lubrication occasioned by frozen oil.

SUPREME AUTO OIL ***Flows Freely at Zero***—starts with the engine—splashes and pumps in the coldest weather, never failing to properly lubricate every part.

Your dealer can perhaps supply SUPREME AUTO OIL—***Look for the Sign of the Orange Disc,*** or write us for particulars and nearest dealer.

Dealers not yet contracted should stock at once. Address nearest office.

GULF REFINING COMPANY

General Sales Offices:
PITTSBURGH, PA.

District Sales Offices:

New York	Philadelphia	Boston
Atlanta	New Orleans	Houston

flows freely at Zero.

R. F. Heinrich

© Clark Equipment Co 1921

"THE SPIRIT OF TRANSPORTATION"

Max Bohm
Franklin Booth
George Elmer Browne
James Cady Ewell
R. F. Heinrich
Frank X. Leyendecker
Jonas Lie
F. Luis Mora
Alphonse Mucha
Maxfield Parrish
C. Coles Phillips
William Mark Young

Civilization has progressed only as methods and means of transportation have improved. Appreciating the contributions to transportation and world advancement made by the American Automotive Industry, we have invited these well known artists to dramatize, each in his own manner, "The Spirit of Transportation."

These paintings will be on exhibit as follows

NEW YORK
Hotel Commodore
January 8th January 15th

CHICAGO
Congress Hotel and Annex
January 29th February 4th

BOSTON
Copley-Plaza Hotel
March 12th March 19th

He honors himself best who honors his industry most

CLARK EQUIPMENT COMPANY
BUCHANAN MICHIGAN

MANUFACTURERS OF
CLARK AXLES and CLARK STEEL WHEELS
FOR GOOD MOTOR TRUCKS

Gear Specialists For 12 Years

So intricate is the task of producing perfect gears that many discriminating vehicle manufacturers wisely entrust it to the veteran Covert organization.

For 12 years we have specialized on gears for Covert Transmissions. Today you can get Covert gears—in Covert Transmissions—in every type of automotive vehicle.

Covert Transmissions are not cheap Transmissions.

The vehicle builders who thus equip their products are buying from us because of Covert quality alone. Gears—and transmissions—mechanically perfect are an asset to them and their customers.

See to it that your next automotive purchase comes equipped with Covert Clutch and Transmission.

COVERT GEAR COMPANY, INC.

Sales, Engineering and Factory: Lockport, N. Y.
Export Offices: 100 Broad Street, New York City

Athol Top Material
a close relative to
ATHOLEATHER

Having convinced manufacturers of the goodness of Atholeather and that, as an imitation, it really does "Outlast the Natural," we have introduced *Athol Top Material*, thus increasing our ability to serve.

Athol Top Material is the result of prolonged investigations in the field. From various sources we learned the faults that became only too apparent through neglect and abuse on the part of the car owner.

To overcome these objectionable features, costly experiments were made and the efforts of our chemists were directed to the elimination of this dissatisfaction by anticipating the cause. The result is a top material of obvious quality. A material slightly heavier and more flexible than the ordinary top material - - but withal thoroughly waterproofed.

To supply the trade with *Athol Top Material* we have constructed and equipped a large complete, modern, factory at Detroit - - and are now in production.

Just as Atholeather has proved its quality, as an upholstery fabric, so will *Athol Top Material* establish itself favorably in the industry.

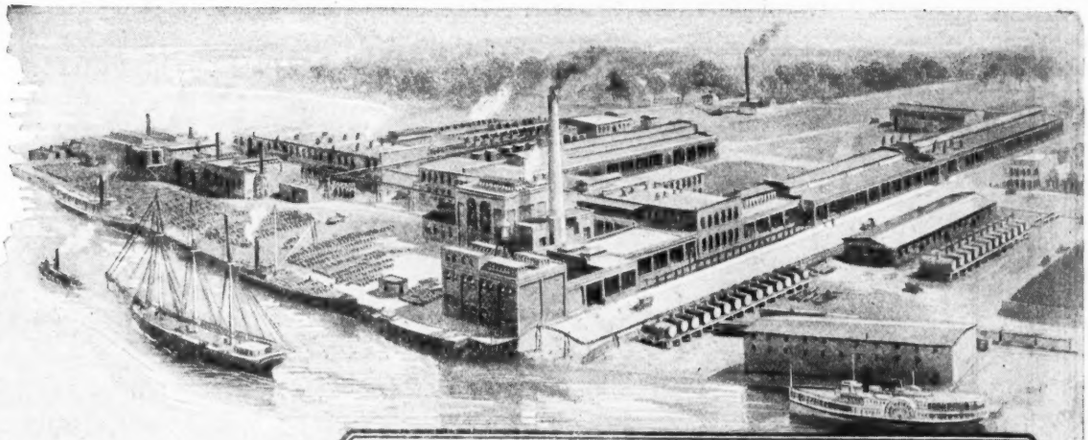
Samples of *Athol Top Material* and Atholeather are always available.
Write for booklet of swatches.

ATHOL MANUFACTURING CO.

Athol, Massachusetts.

New York
505 Fifth Avenue.

Detroit
1216 Book Building



This illustration shows how the coating of Zapon is impervious to water. Wash it as often as you wish—it will not check, fade or discolor.

Try to tear a piece of Zapon. Clutch it firmly and jerk, pull, twist—do anything that would tear an ordinary article. You will find that you haven't harmed the cloth even to the extent of leaving finger marks.

Fold a piece of Zapon and hold it in hands as shown. Then whip the creased part back and forth as often as you like. Now examine the coating—you'll find the surface still unchanged, proving conclusively that Zapon will not crack, check or peel.

You helped make ZAPON what it is

You, who for many years have been buying and buying, repeating and telling others, are responsible for the improvements and present superior qualities of Zapon.

Your purchases led to increased capacity and lowered cost, so that now Zapon is the economical covering.

You suggested colors, grains and finishes and helped to make the Zapon line what it is today.

Your endorsements of our brands—Muleskin, Broncho, Mustang, Moroccoline and Randco—have made them standard.

The experience of more than thirty years is given in Zapon quality.

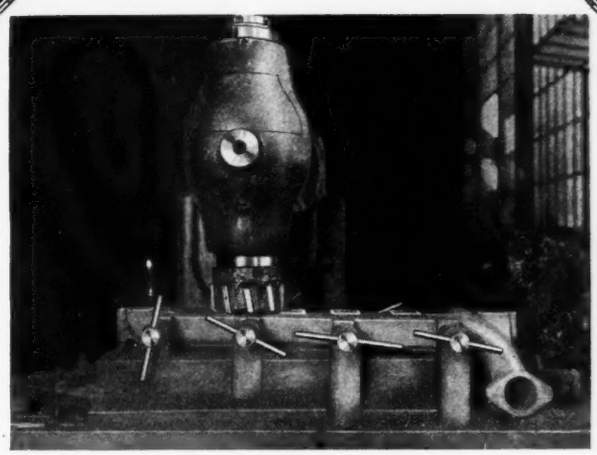
ZAPON LEATHER CLOTH COMPANY
200 Fifth Avenue New York City
Chicago Detroit Los Angeles St. Louis
Leather Cloth of Quality
FIRST IN THE INDUSTRY—STILL IN THE LEAD

ZAPON Leather Cloth

The principal Zapon brands are Muleskin, Broncho, Moroccoline, Mustang and Randco

On Exhaust Manifolds

Photograph through the courtesy of the Haynes Automobile Company. In automotive shops everywhere Milwaukee Milling Machines are every day proving their value in increased production, quality of output, low upkeep and ease of operation.



HERE is shown one of the advantages through the use of Milwaukee Attachments.

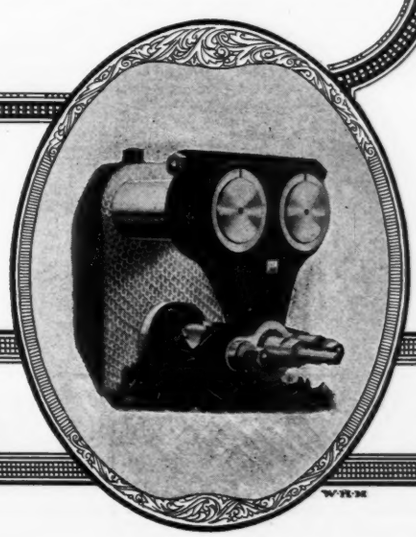
Here we see a Milwaukee Horizontal Milling Machine transformed into a vertical milling machine through the use of a Milwaukee Vertical Spindle Attachment. Like all Milwaukee Attachments, it becomes practically an integral part of the machine, giving thorough satisfaction. In shops where the work does not warrant the purchase of both types, one of these attachments will just about double the usefulness of the Milwaukee Horizontal Milling Machine you already have or are planning to buy.

Know this line of machines and attachments thoroughly. Send for the Milwaukee catalog TODAY.

Kearney & Trecker Company

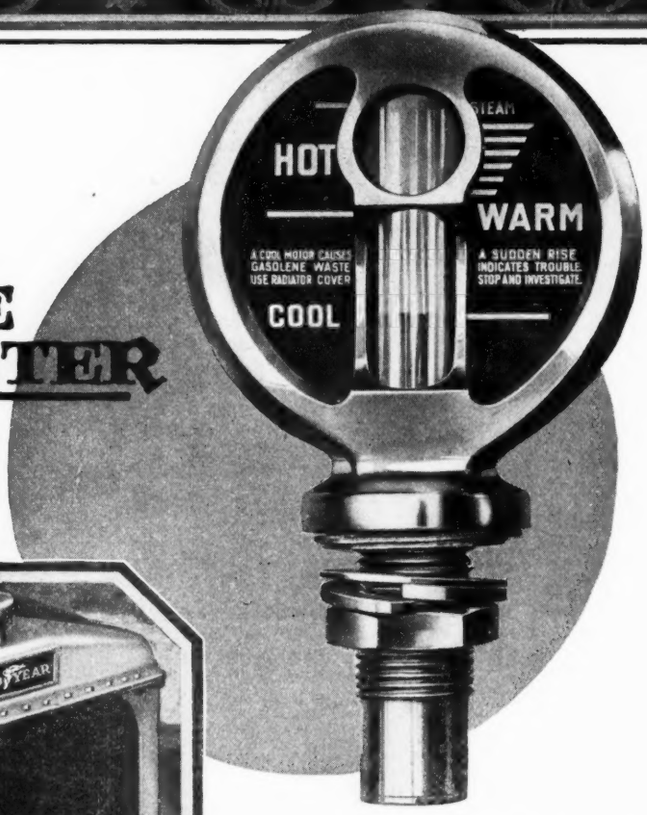
Milwaukee Wis., U. S. A.

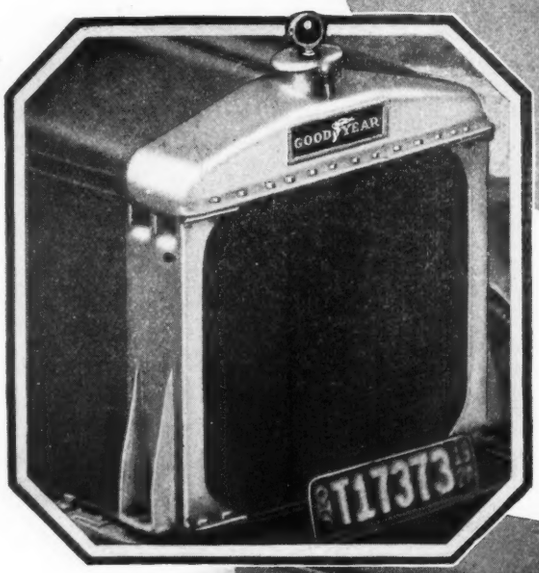
Branch Offices in Chicago, Cleveland, New York



The Double Overarm maintains permanent alignment of the arbor.

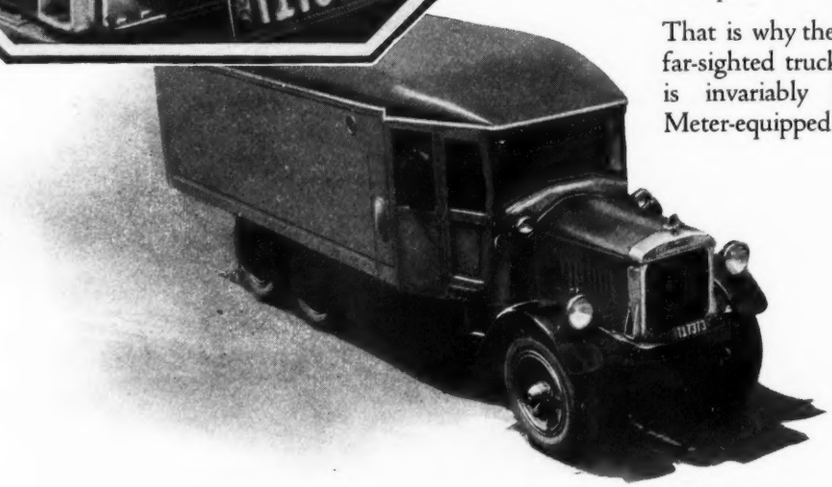
BOYCE MOTO METER


HOT
WARM
COOL
A COOL MOTOR CAUSES GASOLENE WASTE USE RADIATOR COVER
A SUDDEN RISE INDICATES TROUBLE STOP AND INVESTIGATE



WHEREVER the tests involve consistent and economical engine performance, as in the experiments carried out by the Goodyear Company, you will always find the Boyce Moto-Meter on the truck's radiator cap.

That is why the product of the far-sighted truck manufacturer is invariably Boyce Moto-Meter-equipped.



The Moto Meter Co., Inc., Long Island City, N. Y.

—seventeen men with a single creed

Every drop forging that leaves our plant is a working symbol of the faith and industry of each of the seventeen executives who head our organization.

From the President, Vice-President and Treasurer all down the line to the various department foremen one creed directs the work, one goal is held in sight—production of quality forgings that shall reflect nothing but credit upon their makers.

Those who know our organization best remark about the well developed and most unusual team work—the spirit of co-operation that shows itself best in the quality of our products.

We can handle immediately orders for forged parts for passenger cars, motor trucks, tractors, trailers, airplanes, motorcycles, gas and oil engines, etc.

Capacity—Forgings ¼ lb. to 150 lbs.

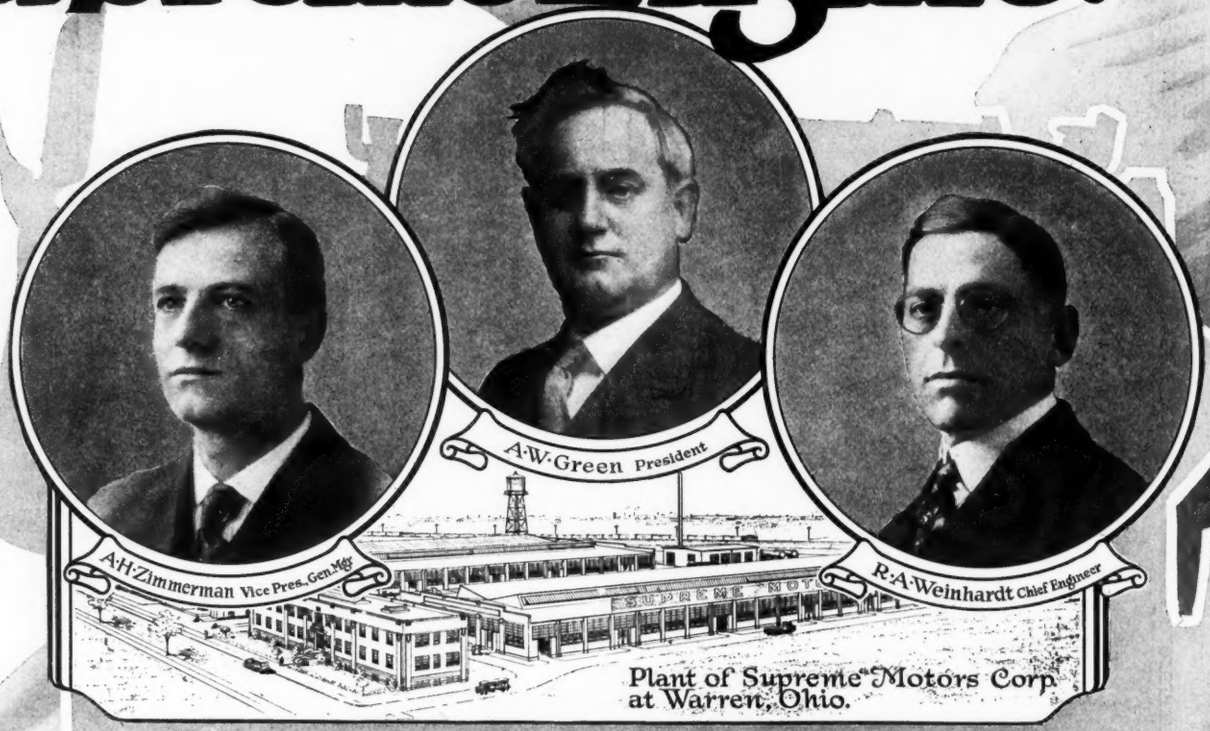
Your inquiry for further information will receive prompt attention.

WDF Quality Forgings

WESTERN DROP FORGE COMPANY

MARION, INDIANA

Who Makes the Supreme Engine?



Plant of Supreme Motors Corp. at Warren, Ohio.

BACK of any great achievement stands personality. Back of the promise of great performance there must be shown a personality that guarantees the promise.

The proven product of The Supreme Motors Corporation as the fulfillment of the demand for a quality power unit manufactured on a large scale production basis—can mean only as much to the Automotive Industry as the personnel of the organization means.

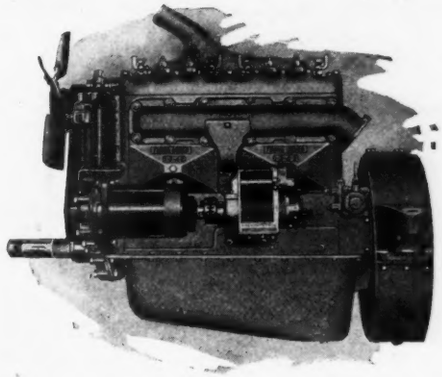
On this judgment the builders of SUPREME Engines are willing to rest: For, gathered together in the Supreme Organization are a group of men whose names have been prominently identified with the building of the best engines since the early days of the industry.

The experience of such men as Green, Zimmerman and Weinhardt is your guarantee of the calibre of men associated in this great undertaking.

SUPREME MOTORS CORPORATION · SUPREME · PEAK OF POWER · ENGINES · WARREN · OHIO U.S.A.

Supreme

"PEAK OF P



Type S-4 4-Cylinder Engine

Some Facts About
SUPREME ENGINES

S-4
4-Cylinder Engine

For passenger cars weighing up to 2800 pounds; speed wagons up to one ton; trucks up to 1½ tons.

Force feed lubrication thru hollow camshaft and drilled crankshaft.

Rigid crankshaft with liberal size bearings.

Hot spot manifold for low grade fuels — exceptional economy.

Sturdy, compact balanced construction means vibrationless performance.

5-K
6-Cylinder Engine

For passenger cars weighing up to 3400 pounds.

Force feed lubrication thru hollow camshaft and drilled crankshaft.

Inherently balanced massive crankshaft, having ample bearing areas.

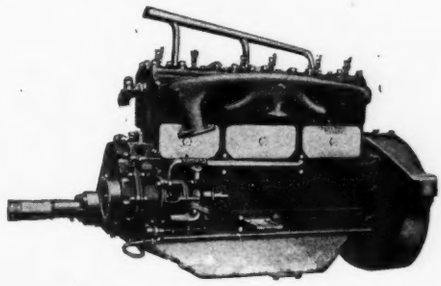
Combination manifold for volatilizing fuels—sends refined dry gas to combustion chambers.

Carburetor mounted on either right or left side of engine.

Freedom from vibration insures long life and continuous service.

Accessibility of both models is keynote of design

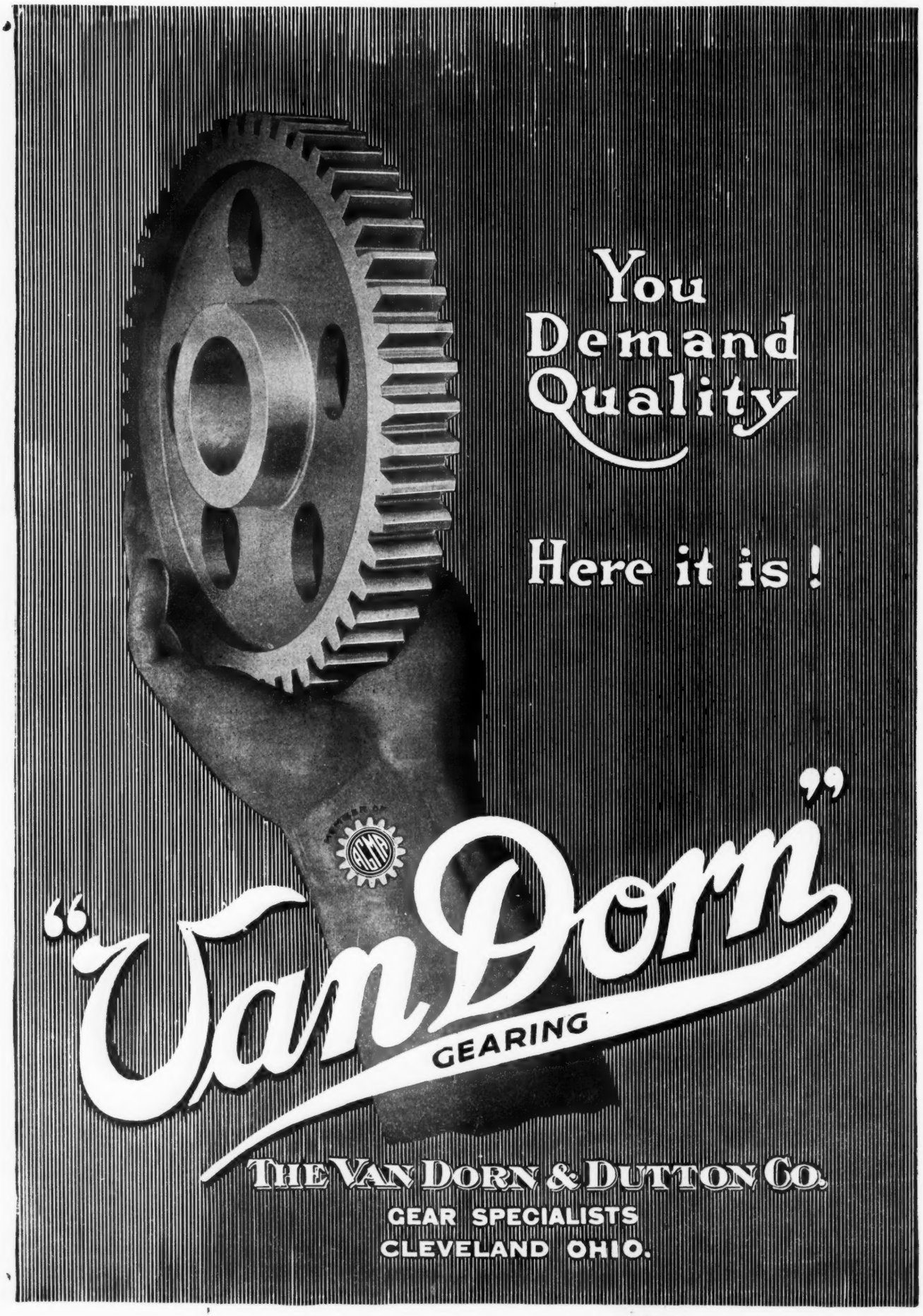
SUPREME MOTORS CORPORATION
Factory and General Offices
WARREN OHIO



Type 5-K 6-Cylinder Engine 3¼ in. x 5 in.

Engines

OWER"


You Demand Quality
Here it is!
"VanDorn"
GEARING
THE VAN DORN & DUTTON CO.
GEAR SPECIALISTS
CLEVELAND OHIO.

On Stewart

BUSH RADIATORS were adopted by this manufacturer six years ago when his first chassis went out "on test" and you'll find BUSH RADIATORS on every STEWART since then.

Ample radiation, strength in each integral part, accessibility for rapid repairs, when necessary; and the best application of established radiation principles are the features which have encouraged manufacturers like Stewart to confine their radiator purchases to BUSH.

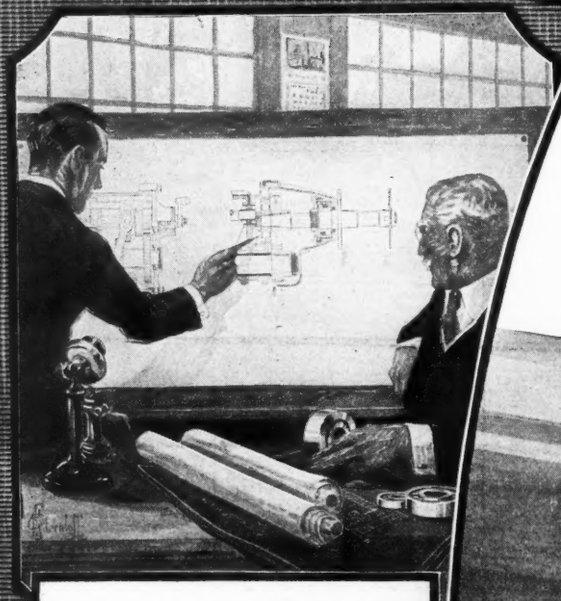
One of the hand operations that illustrates the care and skill that enter into a Bush Radiator. Doing it by hand may be slower but it makes for a better Job.

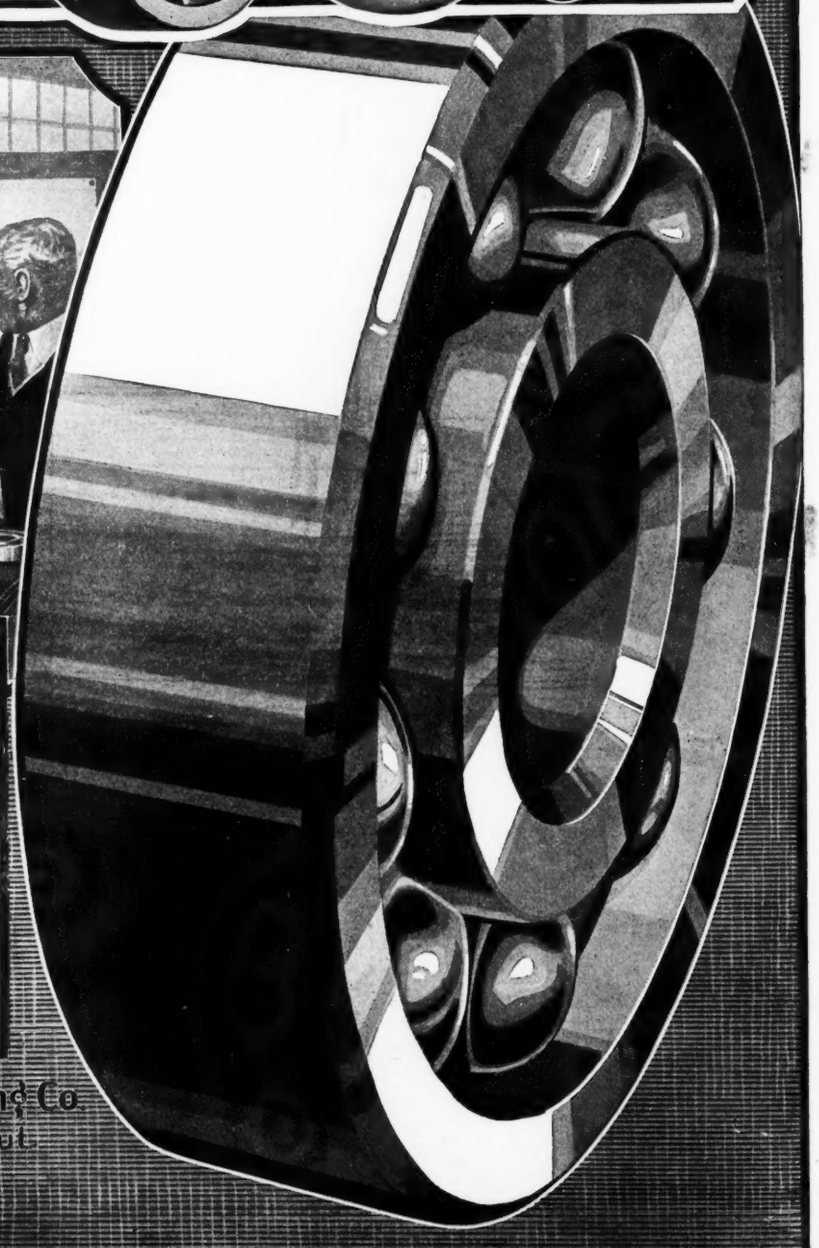
BUSH MANUFACTURING COMPANY
Hartford Conn.

Bush radiators

NEW DEPARTURE

Ball Bearings





The importance of the correct choice of bearings is all out of proportion to the cost or size of that bearing.

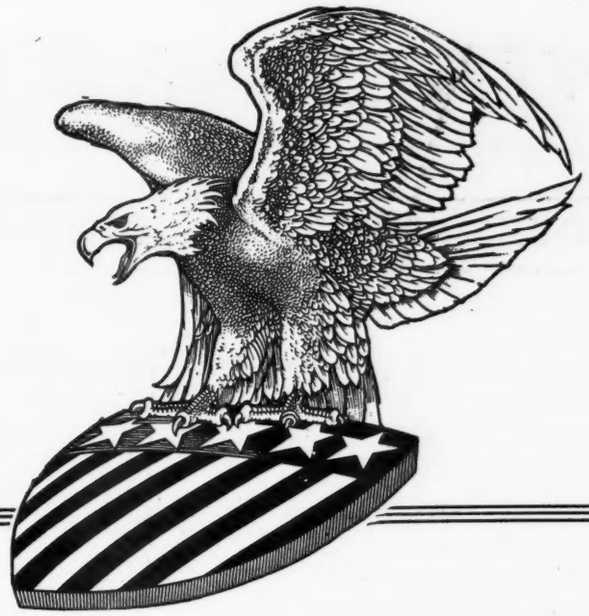
A bearing failure may be very far reaching in its effect. The gears that it locates and supports may be ruined, if life itself is not endangered.

The faith of eminent engineers in the New Departure is based as much upon observation of the bearing in practical service as in laboratory tests.

CONRAD PATENT — CE-8888

569

New Departure Manufacturing Co.
Bristol Connecticut
Chicago Detroit



How Much War Department Surplus Property Can Be Absorbed by Your 1921 Output?

Nearly one hundred thousand individual orders representing sales amounting to nine hundred million dollars is the staggering total of property disposed of through War Department sales to date.

The buying power of America has responded to these sales in a big way, many manufacturers looking to them as a regular source of supply.

Thousands of machines purchased through this channel are in operation. Thousands of motors, generators and other electrical equipment are supplying heat, light and power in every industry. Huge quantities of chemicals have found their way to use through these sales. Thousands of tons of iron and steel from this source have been wrought into every conceivable tool and commodity.

Now is the Time to View Your Future Needs

New products must be produced and sold on a different basis. A basis that recognizes that the 1921 output must be sold to a "buyer's market." This necessitates marked economies in the purchases of equipment and supplies.

The total of machinery and engineering materials still to be offered, while enormous, is not inexhaustible, and this new and different market, with its necessary purchasing economies, promises an ever-growing demand for the remaining stocks.

Consider the possibilities of War Department sales from this angle. The more your 1921 output can absorb the better will be your position under the new selling conditions. The quicker you act, the better your chances of sharing the opportunities offered.

Read Every Item on the Following Pages

WAR DEPARTMENT
"Surplus Property Sales"

Every Item of Pertin

ROUTE THIS ADVERTISEMENT THROUGH YOUR PLANT SO

Eastern Division

E-891

2—Steel Structural Shapes, 54-2 x 7-4. Location—Philadelphia, Pa.

E-616

60—Switchboards, 3 wire, 25 KW., 250 volt. Location—Schenectady, N. Y.

14730

145—Cock Valves, 2"-D-6264. Location—Norfolk, Va.

20129

937,458 lbs. Barbed Wire, painted black. Location—New Cumberland, Pa.

14714

880 Tons Barbed Wire, black. Location—Schenectady, N. Y.

17857

206 Reels Barbed Wire, 4 point. Location—Washington, D. C.

20249

125,300 lbs. Barbed Wire, B. & S. No. 10. Location—Washington, D. C.

13648

7 Rolls Weaving Wire, 1¼" mesh, 78" x 100' x 11 ga. Location—New Cumberland, Pa.

3531

1,235,695 ft. Wire, bare outpost strand. Location—New York.

15303

6 Pulleys, Differential Cap, with double wheel and chain. Used for hoisting. Mfrd. by Yale, Towne Mfg. Co. Location—New York.

E-885

150 Heavy Wire Screens, ¾" mesh, 18" wide. Location—Philadelphia, Pa.

E-884

450 Heavy Wire Screens, 1¼" mesh, 6' 3" wideligs. Located—Philadelphia, Pa.

12644

5233 lbs. Tool Steel, 1½" square, No. 3 temper, for cutters and scrapers, etc. Unannealed. Location—New York.

E-608

22,385 lbs. Strip Steel, cold rolled, oiled. 2" x .050" x 6' to 8'. Packed in bundles weighing from 120 to 180 lbs. Location—New Cumberland, Pa.

10635

2716 Air Tanks, equipment for charging. Location—Philadelphia, Pa.

13187

1-90 Gal. Galvanized Iron Tank. Location—New Cumberland, Pa.

---

122 Inside Calipers. Location—Washington, D. C.

---

96 — Calipers, firm joint, double No. 173-6" and 12". Location—Pittsburgh, Pa.

3005

4—Condensers, W. E., 33 GH, mounted on wooden base; capacity 2.20 M.F. used in telephone service. Mfgr. Western Elec. Co. Location—Philadelphia, Pa.

WAR DEPA

"Surplus Prope

ent Interest

THAT EVERY DEPARTMENT MAY BENEFIT

2—Connections, Reducers, straight lengths, 20″, one end 6″, 8″ ball holes 1⅛″ diam. Parts for refrigerating plants. Location—Philadelphia, Pa.

---

4 Conveyors, gravity sections, 22″ x 121″ iron frame. Location—Baltimore, Md.

13638

2—Independent Engines; double swinging cylinders; compound geared; equipped with reversing valve. Location—New York.

2752

1—Steam Engine, with generator 85 HP. Location—New Cumberland, Pa.

13625

92—Hammers, Riveting, steam operating No. 5. Little David chipping and parts. Location—Norfolk, Va.

14200

9—Hammers, Riveting No. 90, with ⅞″ button head rivet sets. Mfrd. by Ingersoll Rand Co. Location—New York.

13631

1—Hoist, 4 ton capacity with 12″ lift, Wright High Speed. Location—Norfolk, Va.

E-642

29,875 ft. Discharge Hose, 2″ dia., 4 ply, 25′ lengths. Coupling and clamp attached. Location—Pittsburgh, Pa.

E-643

12,500 ft. Discharge Hose, 2″ dia., 4 ply, 25′ lengths. Coupling and clamp attached. Location—Pittsburgh, Pa.

E-644

37,375 ft. Discharge Hose, 2″ dia., 4 ply, 25′ lengths. Coupling and clamp attached. Location—Pittsburgh, Pa.

RTMENT
rty Sales"

MACHINERY and ENGINEERING MATERIALS List No. 13

Sold By Negotiation

HOW TO ORDER

All orders and negotiations for materials offered in this list must be addressed to the Depot Quartermaster of the division where material is located. These divisions and the addresses of controlling offices are given below. To obtain a complete list of materials not listed in this advertisement, clip and mail the attached coupon.

LIST OF DIVISIONS AND CONTROLLING OFFICES

Eastern Division
59th St. & 1st Ave., Brooklyn, N. Y.

Central Division
1819 West 39th St., Chicago, Ill.

Southern Division
Transportation Bldg., Atlanta, Ga.

Southwestern Division
San Antonio, Texas

Northeastern Division
Army Supply Base Boston, Mass.

COUPON

Chief Sales Promotion Section, Office of the Director of Sales, Room 2515, Munitions Building, Washington, D. C.

IMPORTANT Mail Coupon To This Address.

Kindly send M. & E. M. List No. 13.....in its entirety.

Firm Name .....

Street Address .....

City ..... State.....

Signed By .....

Automotive Ind.

ADDITIONAL ITEMS

from

MACHINERY AND ENGINEERING MATERIALS

List No. 13

TO BE SOLD BY NEGOTIATION

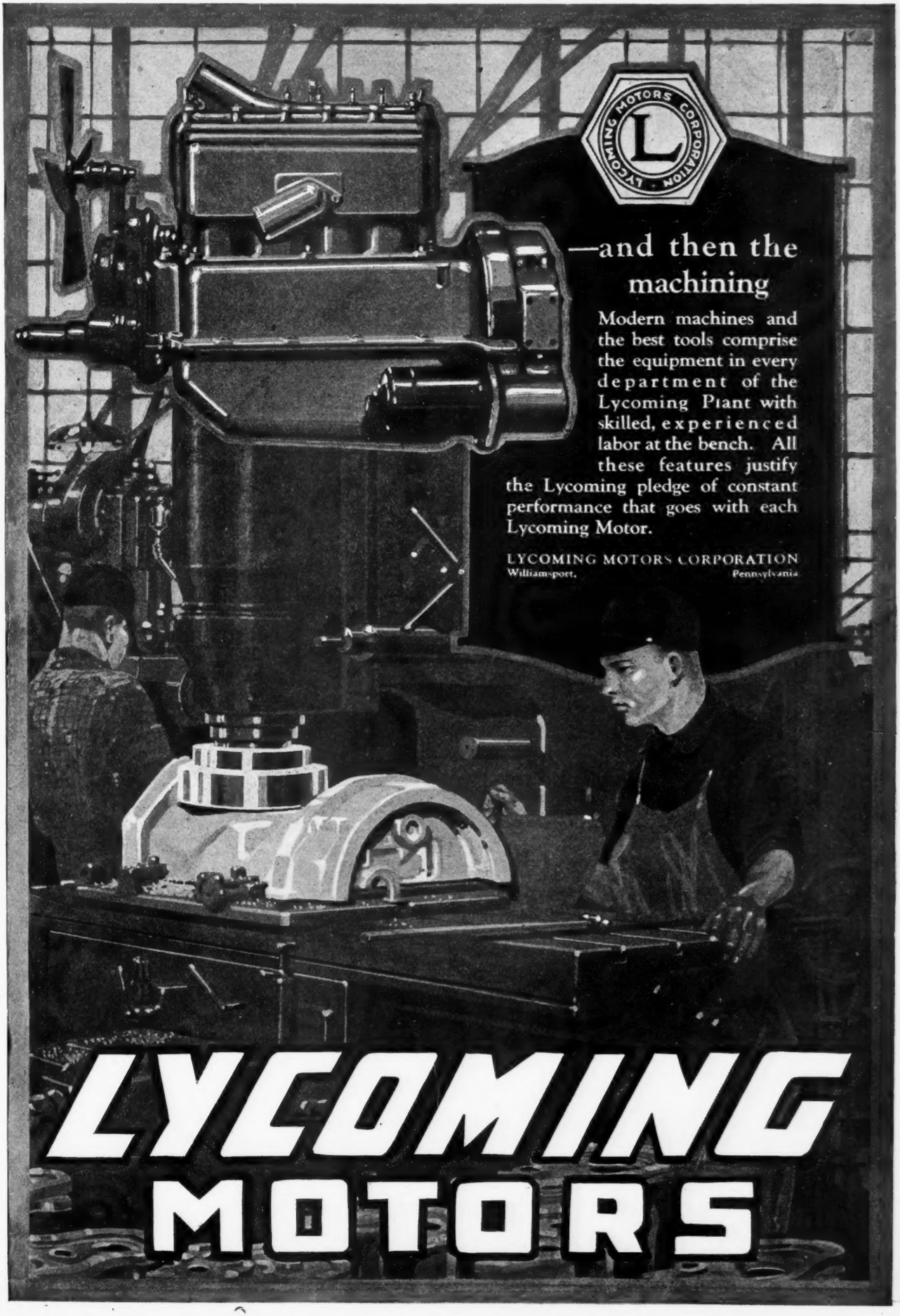
Aneriod Barometers
Cannister Bottoms
Compass Boxes
Ratchet Braces
Brass Grommets
Brass Fasteners
Brass Hock Parts
Brass Loops
Brass Rivets
Brass Slides
Brass Studs
Brass Washers
Load Covered Cable
Telephone Cable
Cable Releases
Canvas, O. D.
Concrete Push Carts
Compass Watches
Duck, O. D.
Dynamite
Gas Mask Eye Lenses
T. N. T. Cylindrical
Trench Fans
Flashlights
Fuses
Fuse Dust
Generator Sets
Air Hose
Suction Hose
Expansion Joints
Electric Knives
Metal Forming Machines
Machine Check Writers
Motors
Cannister Nozzles
Oil for Break Switches
Loom Oil
Lard Oil
Quenching and Tempering Oil
Pipe Fittings
Nipples
Malleable Pipe
Sewer Pipe
Signal Plugs
Galvanized Bit Plugs
Steel Springs
Rubber Tape
Cannister Tops
Tripods for Heliographs
Wrist Watches
Plain Copper Wire
Resonators
English Screws
Shanks for Indicator Posts
Bar Steel
I-Beams
Structural Steel
Wrought Iron
Angle Posts
Screw Posts
Galvanized Rods
Corrugated Iron Shelters
Crucible Tool Steel
Steel Hoops
Tool Steel
Vertical Tubular Boilers
Level Books
Plant Construction Books
Logging Carts
Beaded Edge Casings
Zincographic Chests
Campeners
Chief Operator's Desks
Drawing Boards
Motor Fuses
Meat Grinders
Knife Grinding Machines
Gun Box Board
Hob Nails
Engine Lathes
Motors for Grinders
B. T. Boilers
Portable Pile Drivers
Cavalry Plastrons
Boiling Plates
Screw Plates
Stocks and Dies
Coupling Poles
Payout Reels
Relay Racks
Hand Rip Saws
Spare Parts for Steam Engines
Buffalo Shears
Flagstaffs
Tanks, Wood
Film Tanks
Storage Tanks
Winches
Boilers and Covers
Cold Rolled Steel
Hoisting Engines
Concrete Mixers
Oil Reclamation Plants
Wire Firing Reels
Unions
Galvanized Iron Wire
Anti-Dimming Outfits
Very Pistol Shells
Bicarbonate of Sodium
Sulphur
Rubber Outlet Valves
Expanded Metal Sheets
Cement Glue
Litharge
Respirators, Horse
Warning Signals, Gas
Trench Sprayers
Rubber Tubing
Wire Outlet Valves
Horseshoe Nails

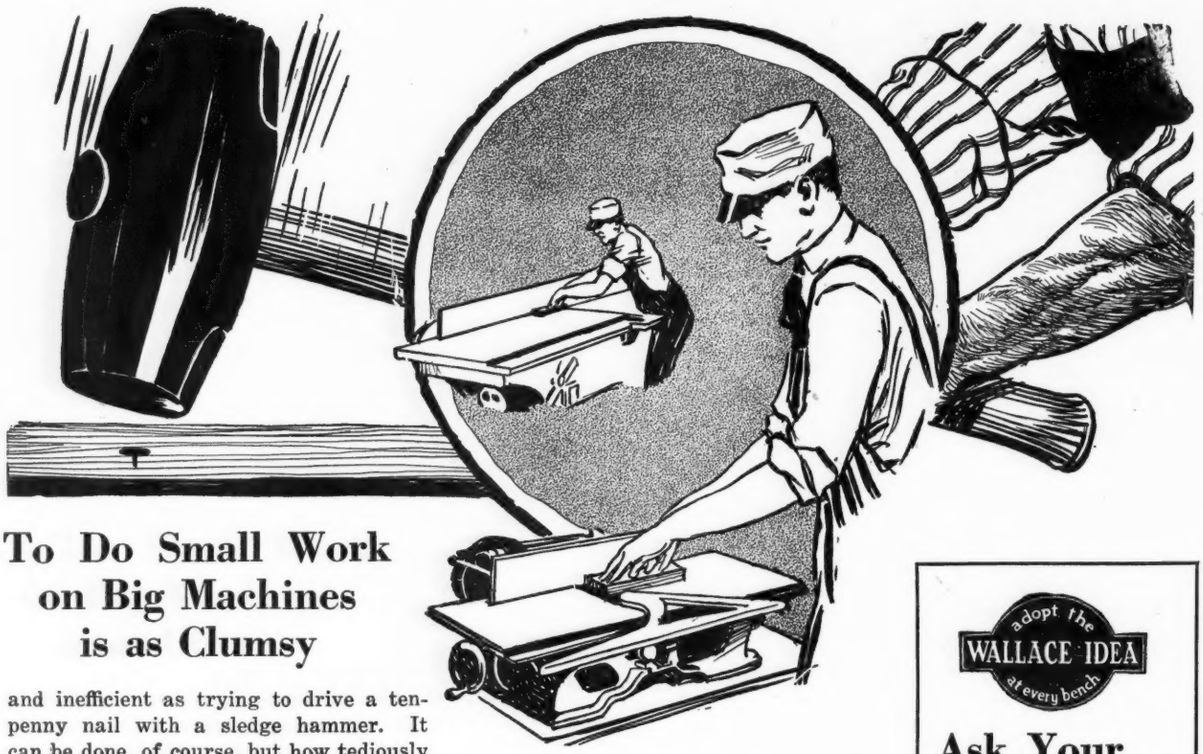
SURPLUS PROPERTY BRANCH

Office of Quartermaster General
Munitions Bldg., Washington, D. C.

WAR DEPARTMENT

"Surplus Property Sales"


LYCOMING MOTORS CORPORATION
L
—and then the machining
Modern machines and the best tools comprise the equipment in every department of the Lycoming Plant with skilled, experienced labor at the bench. All these features justify the Lycoming pledge of constant performance that goes with each Lycoming Motor.
LYCOMING MOTORS CORPORATION
Williamsport, Pennsylvania
LYCOMING
MOTORS



To Do Small Work on Big Machines is as Clumsy

and inefficient as trying to drive a tenpenny nail with a sledge hammer. It can be done, of course, but how tediously a man must work, and because it is tedious it is therefore slow, hazardous and mighty costly for you.

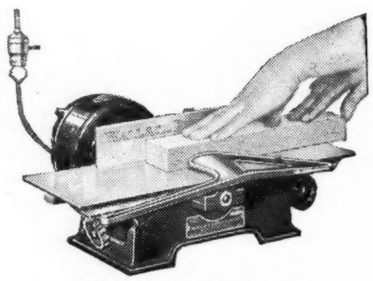
Think it over—it is a new thought, and when one is accustomed to doing a thing one way it is not very easy to see it another. But try sawing, trimming or jointing or any of the operations in cabinet, pattern or assembling work on big machines. You are very careful and always apprehensive.

If you had a smaller machine, the Wallace Bench Planer or Jointer or Saw, you would run this stock over in a jiffy and be done in half the time.

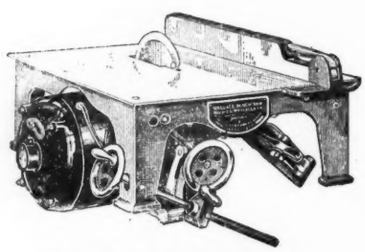
Then, too, besides this decided time saving advantage of using Wallace Bench type machines for bench work, you profit by other advantages, i. e., you can take these Wallace Bench Machines to the work—they are portable. They set on the bench or along the side of it and at the elbow of the workmen. thus they save many time consuming trips to the big machines and so handy the men do little, if any, hand sawing or planing.

No wonder over 10,500 Wallace Bench Planers, Jointers and Saws are in daily use. You will find them at every bench in many pattern or cabinet and carpenter shops and in production work in plants.

Investigate the Wallace Idea, for we know it will pay you. Ask any high class machinery dealer—phone or write us.



The Wallace Bench PLANER



The Wallace Bench Saw

adopt the WALLACE IDEA at every bench

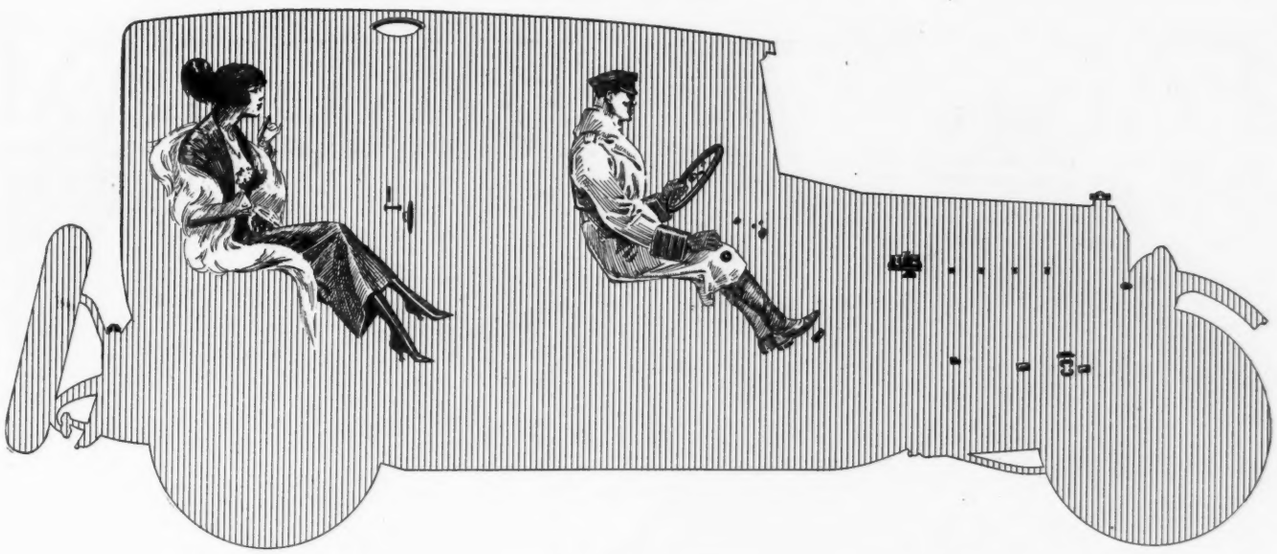
Ask Your Machinery Dealer

Wallace Bench Machines are sold by regular dealers who have anticipated your requirements — they are familiar with the performance of these machines now in use, and their advice is therefore based on actual experience.

Our regular dealers have machines available to demonstrate the adaptability of the Wallace idea to the various operations you have in mind, and they are in a position to make prompt delivery from stock. They carry a full line of repair parts and instructions.

J. D. WALLACE & CO.

1422 W. Jackson Blvd. Chicago, Ill.



LATCH HANDLES
DOOR HANDLES
TELEPHONE RECEIVER
LAMP BASES
FILLER CAPS
SWITCH KNOBS
METER CASES
FUSE BOXES
CHOKER HANDLES
VENTILATOR ADJUSTING KNOBS
HORN PUSH BUTTONS
STARTING SWITCH BASES
GEAR SHIFT LEVER BALLS
STEERING WHEELS
LAMP CONNECTORS
RADIATOR CAP
DISTRIBUTOR CAP
ROTOR
HIGH TENSION OUTLET
COIL COVER
COIL CAPS
GENERATOR TERMINAL BLOCKS
STARTING MOTOR CABLE BUSHING
TERMINAL SLEEVES
SPARK PLUG CAPS
CABLE SEPARATORS

NO longer is molded insulation considered a mere detail, for since the advent of Condensite it has become an essential part of the modern car.

The above illustration gives an idea of some of the uses to which Condensite has been applied in the automotive industry.

A glance at our No. 6 pamphlet—sent on request—may prove the solution to that problem before you.

Condensite Company *of* America, *Bloomfield,* N. J.

Condensite

PARISH & BINGHAM

PRESSED STEEL FRAMES

Frame Makers For Cars of Quality Since 1904

—this quality standard is reflected by the other pressed steel products—axle housings, brake drums, torque arms, step hangers and running boards. Send blue prints and specifications for quotations.

PARISH & BINGHAM CORP.

Cleveland
Fifth City
Ohio

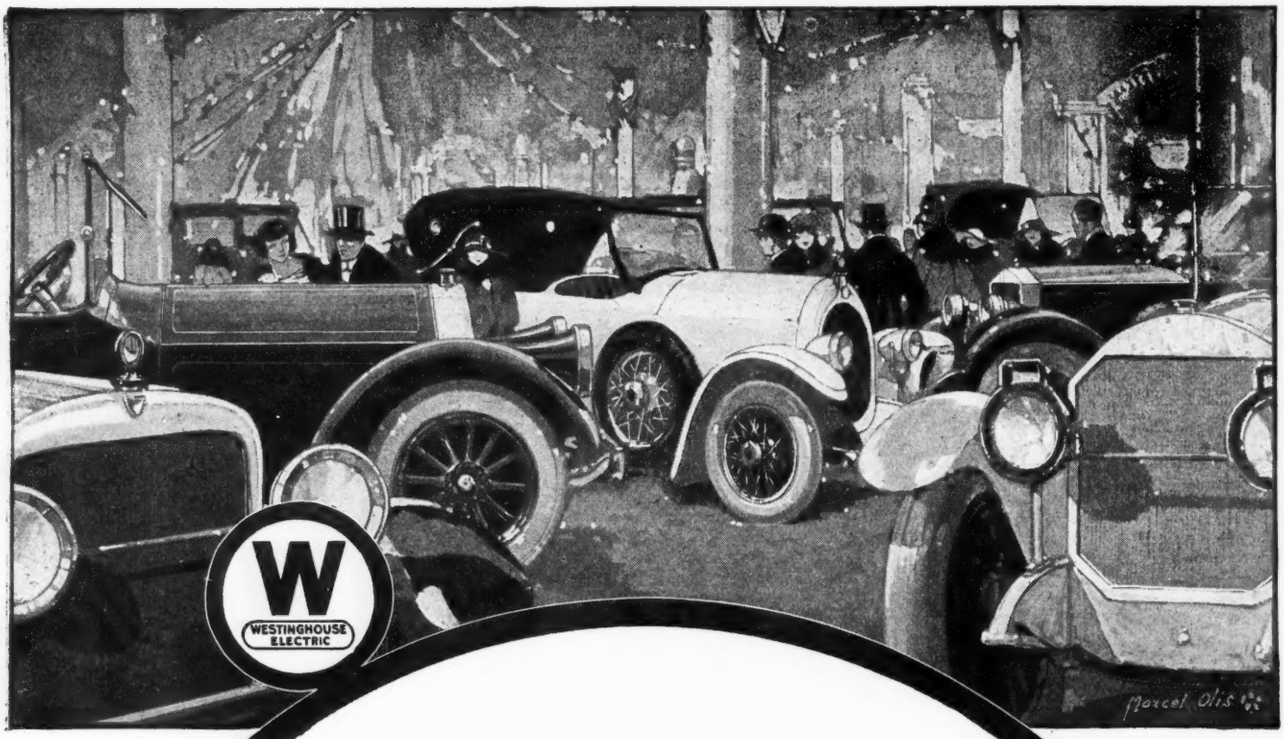
MICHELIN Disc Wheels

THE intrinsic merit of Michelin Disc Wheels is becoming better known, month by month, thru Michelin Wheel Advertising. Will your cars for 1921 be equipped with these advanced wheels?

Manufactured and sold in the United States exclusively by the

BUDD WHEEL CORPORATION

PHILADELPHIA



What *Makes* a Fine Car?

The *fine car* earns its place by *additional* values in appointment and ability. It embodies all the refinements, all the justifiable superlatives, that good automotive practice has so far developed. It is classified on a basis of admirable performance and beautiful appearance.

The makers of such cars, whether here or abroad, can take no chances on the electrical equipment obtained from outside sources. They test for *additional* values, as usual.

It is surely significant that so many of them turn to Westinghouse for Electric Automotive Equipment.

WESTINGHOUSE ELECTRIC & MANUFACTURING CO.
Automobile Equipment Department
General Sales and Service Offices: 82 Worthington St., Springfield, Mass.
Works: East Springfield, Mass.

Westinghouse

ELECTRICAL EQUIPMENT FOR AUTOMOTIVE VEHICLES

Buy Broaches on a QUALITY Basis

QUALITY should be the first requisite when buying a broach. For, the life of the broach depends on quality and, after all, it's broaching service you are buying—not merely a device to cut holes.

The first step toward quality is broach accuracy—accuracy such as characterizes the manufacturing operation of every J. N. Lapointe Company broach from its inception to the finishing grind—from the careful selection of the highest grade of bar steel to the half-thousandth of an inch graduation in the cut of the finishing teeth. Nothing is left to chance—no guesswork is tolerated—every broach must measure up to the J. N. Lapointe Co. quality standard.

It is this broach quality, this broach accuracy — insuring maximum broaching service and maximum quantity production—which has put the J. N. Lapointe Company's broaches on a plane where price is a minor consideration.

We solicit commercial broaching—any quantity. Send us your blueprints for quotations.

Have you a copy of the J. N. Lapointe Co. catalog in your files?

2086-L

J.N. LAPOINTE CO.
OF NEW LONDON, CONN.

DETROIT OFFICE: 31 Harper Ave.

Makers of Broaching Machines and Broaches:

REPRESENTATIVES—GREAT BRITAIN: Charles Churchill & Co., Ltd., 9-15 Leonard St., Finsbury, London, E. C. FRANCE: Fenwick Freres & Co., 8 Rue de Rocroy, Paris. BELGIUM: Fenwick Freres & Co., Liege. SWITZERLAND: Fenwick Freres & Co., Zurich. ITALY: Fenwick Freres & Co., Torino. SPAIN: Fenwick Freres & Co., Barcelona. JAPAN: Commercial Co. of Tokio, Tokio. AUSTRALIA: H. P. Gregory & Co., Sydney. NORWAY: Gustav Nielsen, Christiania. SOUTH AMERICA: W. R. Grace & Co., Hanover Sq., P. O. Box 286, New York City. DENMARK: Chr. A. Herstad, Copenhagen. FINLAND: Chr. A. Herstad, Copenhagen, Denmark. SWEDEN: Chr. A. Herstad, Stockholm.

Know the Towmotor—You will be a better buyer of plant-haulage equipment

The excess power engine, strong traction pull and quality work throughout enables the Towmotor to prove its remarkable hauling powers in every day use. It is successfully solving plant-haulage problems in every branch of industry.

Bulletin No. 2 explains this sturdy little traction giant. May we send you a copy? Write today.

The Towmotor Co., 1226 E. 152nd St.. **Cleveland, Ohio**

TOWMOTOR

Axle Quality Adds to Truck Quality

The quality of the constituent parts that enter the construction of motor trucks these days is scrupulously watched by builders, because these parts determine the performance and survival of the complete vehicle. Unless there is assurance that parts will serve creditably there can be no assurance that the truck will endure.

The Iron Mountain engineers are satisfied that the inclusion of Iron Mountain Worm Drive Axles on trucks will add distinctly to the service and performance of every vehicle upon which they serve.

IRON MOUNTAIN COMPANY, 927 East 95th St., Chicago, Ill.

Front Axles
for
Speed Wagons
Light Trucks

FLINT MOTOR AXLE

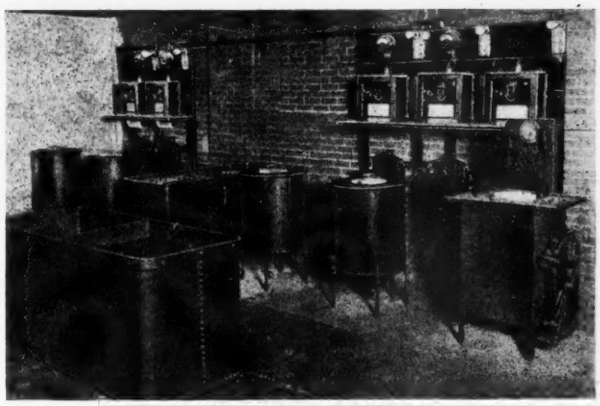
QUALITY

The inclusion of Flint Front Axles in the specifications proves that the manufacturer realized the worth of quality parts—the wisdom of building for a permanent reputation instead of a low price.

Flint Front Axles are designed especially for speed wagons and light trucks from 1,000 lbs. to 2 tons. They are Timken equipped. Send for blueprint and specifications.

Flint Motor Axle Company
Flint, Michigan

Longer Life for Tools and Dies Results from Correct Hardening



Ingersoll-Rand Co., Phillipsburg, N. J.

And correct hardening results from the use of the HUMP METHOD.

The HUMP shows when the piece goes through the critical point.
The rate of heating is put under your control.
Results can be duplicated by repeating the heating curves and quenching from the same point with reference to the HUMP.

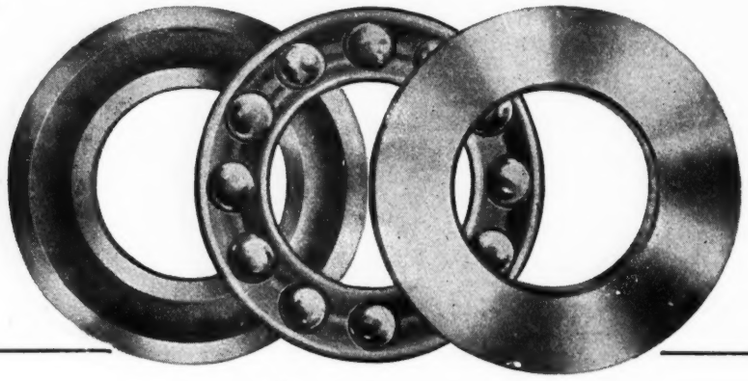
Catalogue 90T describes the HUMP METHOD and equipment.

LEEDS & NORTHRUP COMPANY

Electrical Measuring Instruments
Pyrometers—Hump Electric Furnaces

4901 Stenton Ave.
Philadelphia, Pa.

1304 Monadnock Block
Chicago, Ill.



THRUST BALL BEARINGS manufactured to your exact requirements.
"STAR" BALL RETAINERS for thrust, magneto and cup and cone bearings.
DROP FORGINGS.

THE BEARINGS COMPANY OF AMERICA
LANCASTER, PENNA.

Western Sales Office, 1012 Ford Bldg., Detroit, Mich.

Why produce a part by machining when you can have "Do-Di" Finished Brass Castings

The use of "Do-Di" finished brass castings is a logical means of lessening the cost of many machine parts. They can be made to minute limit measurements and in either brass or bronze alloys.

They have the advantage of sharp outlines, perfect contour, greater accuracy, all holes cast and absolute uniformity of the metal. The cost of machining a sand moulded part, plus the waste of superfluous metal and the frequent rejection after machining makes the use of "Do-Di" finished castings an important economy.

We will be glad to tell you of the work of this kind we are doing for others.

Ask for pamphlet on

"Finished Brass Castings"

THE WORLD'S LARGEST MANUFACTURERS OF DIE CASTINGS

DOEHLER DIE-CASTING CO.

MAIN OFFICE AND EASTERN PLANT BROOKLYN, N.Y. CENTRAL PLANT TOLEDO, OHIO. WESTERN PLANT CHICAGO, ILL.

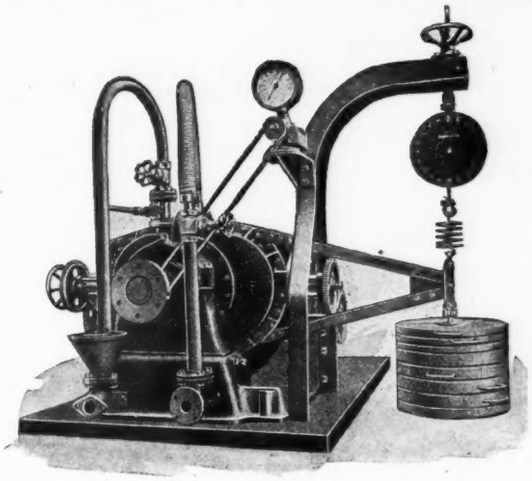
SALES OFFICES IN ALL PRINCIPAL CITIES

Of Immediate Interest—

FROUDE HYDRAULIC ABSORPTION DYNAMOMETERS

Are Now Made and Distributed in the United States

FROUDE DYNAMOMETERS are built in all sizes and in special types for testing or running-in gas engines. Each dynamometer has a large range in both capacity and speed.



FROUDE DYNAMOMETERS are scientifically accurate, inexpensive and easily operated. They run silently and either load or speed, or both, may be varied while operating.

Manufactured by

C. H. WHEELER MANUFACTURING CO.

PHILADELPHIA PA.

Write for interesting, illustrated bulletin.

In use by: Rolls-Royce; The Siddeley-Deasy Motor Car Co.; Austin Motors; The Daimler Motor Co.; The Sunbeam Motor Car Co.; D. Napier Sons; and almost all of the other English, French, Italian, and Spanish Motor Manufacturers.

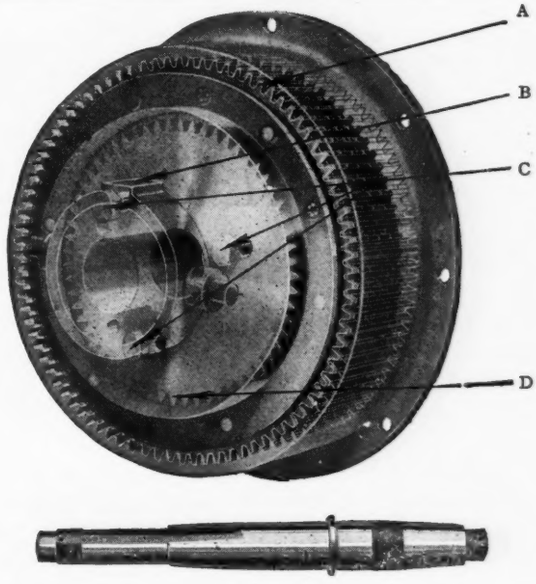
The Velvet Clutch *With the Bull-Dog Grip*

DETLAFF

Eliminate Doubt in Performance

Probably no other part has a greater effect on the ease of handling than the clutch; and much of the popularity of Detlaff clutches is due to their smooth yet positive action. Added to this is a freedom from trouble that insures continued satisfaction that is measured by years.

Our engineering department will gladly co-operate with you to fit the Detlaff to your layout.



A.D.—Gear Tooth drive on all discs.
B.—Lubrication from any convenient point.
C.—Long, easy springs compensate automatically for facing wear.

Detlaff Clutches will be shown at the 6th National Tractor Show at Columbus, Ohio. We shall be glad to send complimentary tickets to interested visitors.

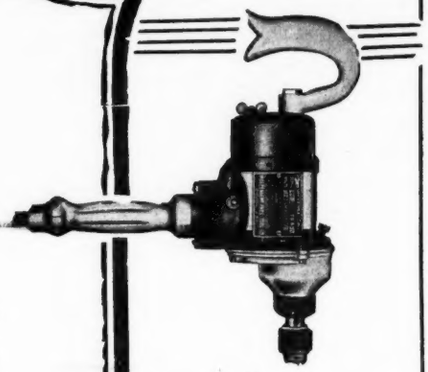
A. J. DETLAFF COMPANY, 123 Lafayette Avenue, East, Detroit, Mich.

96 Ninth Street, San Francisco; 202 Chamber of Commerce, Indianapolis; 2 Columbus Circle, New York.

(52)

Thor

PORTABLE
Electric Drills



No. 00
5/16 inch
Drilling Capacity
Licensed under Burke Universal Motor Patent.

Equipped with Motor for operating on Direct or Alternating Current or may be furnished with Motor wound for Direct Current exclusively. 110-20 volts.

The kind of tools your men have pleasure in using

Give a man a tool that makes his work lighter and easier, and he will repay you with increased output.

Thor Universal Electric Drills, light, powerful, easily controlled and well balanced, insure greater speed and efficiency on light drilling operations. Portability and economic operating costs bid for consideration in reduction of costs.

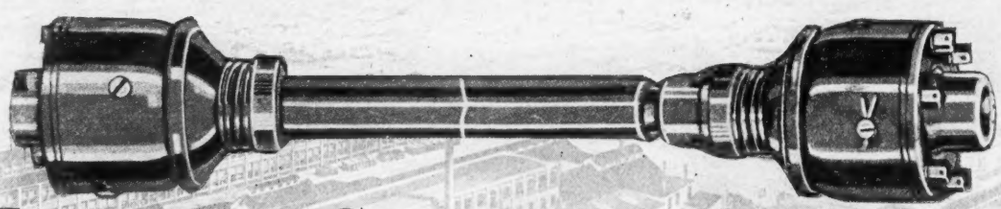
Reductions of time on certain operations run as high as 80% in some of the largest automotive manufacturing plants.

There is a size and type for every job. Write us for descriptive literature.

Investigate Our Agency Plan.

Independent Pneumatic Tool Co.
600 W. Jackson Blvd.
Chicago, Illinois

The Factory Behind
Hartford
The Joint of Universal Satisfaction



Increased Capacity & Efficiency of Organization
Insures Dependable Service Always
Hartford Automotive Parts Co.,
HARTFORD, CONN.

SPOT WELDING

The *Thomson Method of Spot Welding* is saving many concerns throughout the country from 60 to 90% of what other methods cost them.

The range of Thomson Welding is almost unlimited. We are opening new fields every day.

May we prove to your satisfaction what we can save you?

Send for Bulletin SB.

BUTT WELDING

The *Thomson Method of Butt Welding* has been in use for over twenty-five years. Many of the first machines made are still performing at an immense saving for the owner.

Of course Thomson Butt Welders during all this time have been continually improved—so that now their accomplishments are almost unbelievable.

Send for Bulletin BB.

Thomson Spot Welder Co. **Thomson Electric Welding Co.**

LYNN, MASS., U. S. A.

Buffalo: 595 Ellicott Square Bldg.
Chicago: 817 West Washington Blvd.
Cincinnati: Knowlton and Langland Sts.
Detroit: English & Miller Machinery Co.
Grand Rapids: McMullen Machinery Co.

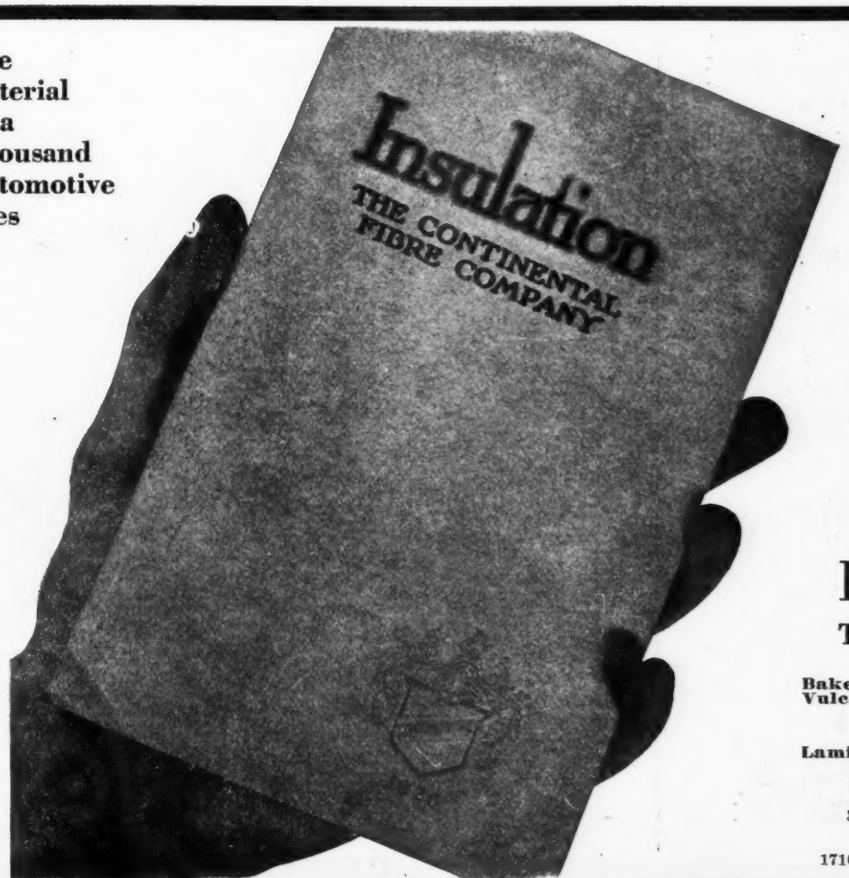
DISTRICT SALES OFFICES

Kansas City: English Tool & Supply Co.
Lynn: 161 Pleasant St.
New York: 1604 U. S. Express Bldg.
Philadelphia: 1211 Widener Bldg.
Pittsburgh: J. S. Miller Machinery Co.
San Francisco: Charles A. Dowd Sales Co.
St. Louis: 208 Security Bldg.
St. Paul: Savage & Winter Co.

FOREIGN BRANCH AGENCIES

Allied Machinery Company de France, Paris, France.
Allied Machinery Company d'Italia, Turin, Italy.
Allied Machinery Company de Espana, Barcelona, Spain.
Allied Machinery Company, Ltd., London, England.
Allied Machinery Company, c/o Benson Bros., Ltd., Sydney, Australia

The Material of a Thousand Automotive Uses



A Valuable Reference Book for Automotive Engineers

It may indicate an improvement in service or a saving in cost of production.
High dielectric and tensile strength; heat and water proof; light; hard; tough; homogeneous; chemically inert; insoluble; infusible; and readily machined. All are properties possessed by

Bakelite-Dilecto

The Continental Fibre Co.
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Bakelite-Dilecto, Continental-Bakelite, Vulcanized Fibre in Sheets, Rods, Tubes and Special Shapes.

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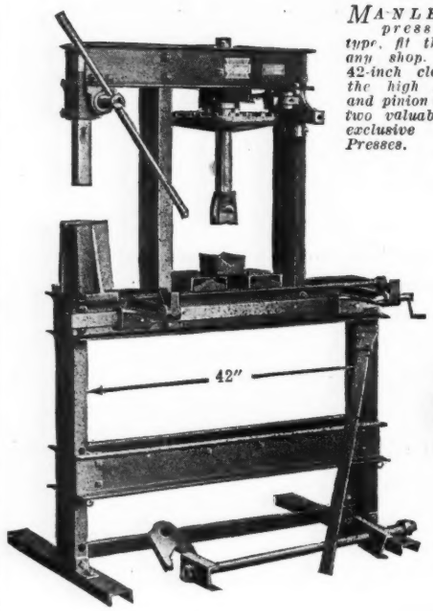

MANLEY 22-ton presses, screw type, fit the needs of any shop. Note the 42-inch clearance and the high speed rack and pinion attachment; two valuable features, exclusive to Manley Presses.

MANY a good car is blamed for faults that in truth belong to the careless repair work of some "sledgehammer mechanic."

The chief cause of poor workmanship is lack of suitable repair shop equipment.

The Manley Press—developed especially for auto repair work—insures better workmanship by virtue of its unusual range, capacity and adaptability, features that are unequalled in any other press.

Manley Presses have a 22-ton capacity. They all provide the exclusive Manley features: High Power Leverage—High Speed—Horizontal Stroke—Quick Changing Tables—Bolted Construction, etc. The Manley Press not only insures quality repairs on pressure fitted work—*it guarantees to do better and more work than is possible by any other method.*

The full Manley line constitutes an efficiency corps always guarding your car against the poor repairing that will surely give it a bad name.

Let us help you to encourage all service stations to do better work. Write for the Manley catalog and see how we can help you safeguard your product.

The Manley Manufacturing Co.
York, Pa.

WE also manufacture Cranes, Portable Benches, Wrecking Cranes, Oil Services, Bench Motor Supports.

Manley
Garage Equipment
MADE IN YORK, PA.

LE ROI the Little Giant of a Motor

¶ There isn't a rough spot in a Le Roi Motor. Every part has been refined, balanced and finished to the finest degree that engineering skill can devise.

¶ This accounts for the smooth, strong pulse of power the Le Roi motor provides for every machine on which it is equipped.

¶ The wide variety of uses in which the Le Roi is proving satisfactory is an indication that manufacturers not yet Le Roi-equipped should investigate.

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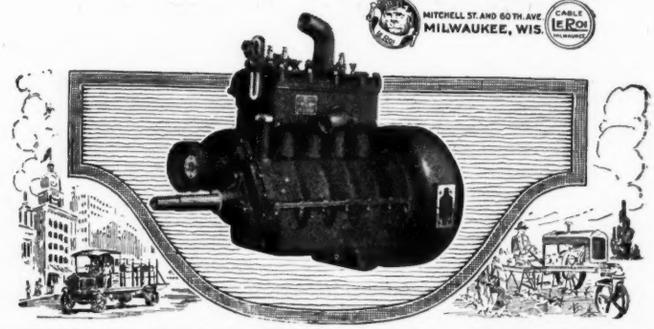
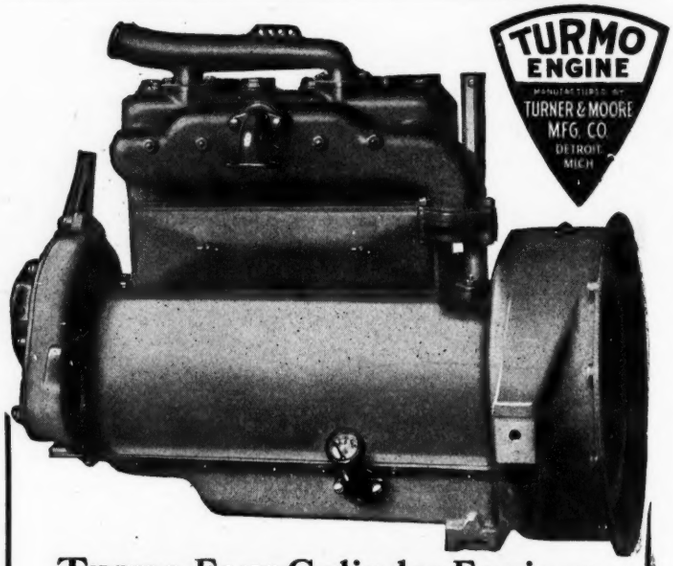
CABLE LE ROI MILWAUKEE





Turmo Four Cylinder Engines

Two Sizes: 3 in. x 5 in. and 3½ in. x 5 in.

Full pressure gear pump lubrication through hollow crankshaft to all bearings.

Highly efficient dry gas hot spot manifold.

EXCELLENT THERMAL EFFICIENCY
S. A. E. STANDARD MOUNTINGS FOR ALL ACCESSORIES

Turner & Moore Mfg. Co.
32 Merritt Ave.
DETROIT, MICH.

ARE You machining from solid stock when you could stamp or draw to size more economically?

Lots of folks who have done this in the past are now using metal stampings made on "BLISS" Presses.

We do *not* make stampings but we can tell you who does and—better still—we can give you the names of just the firms best fitted by experience and equipment to do exactly the thing you need.

Ask us—but don't forget to include a sketch and description of the article or parts

BLISS

E. W. BLISS COMPANY

Main Offices: BROOKLYN, N. Y., U. S. A.
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WICKES BLUE PRINT SYSTEM SAGINAW-MICHIGAN

Why a Wickes Machine Gives You Perfect Blueprints—

THE lighting arrangement, consisting of a mercury vapor lamp, gives evenly toned prints, always accurate and true. There are no faded lines or blotches on a Wickes blueprint.

You will find no fragile glass cylinder in a Wickes. There are no ventilating fans, series of belts, it's a simple machine.

One of the outstanding features is the self-cleaning, long-lived and unbreakable cylinder. It consists of open grill work of spirally disposed wires, through which heat easily passes off.

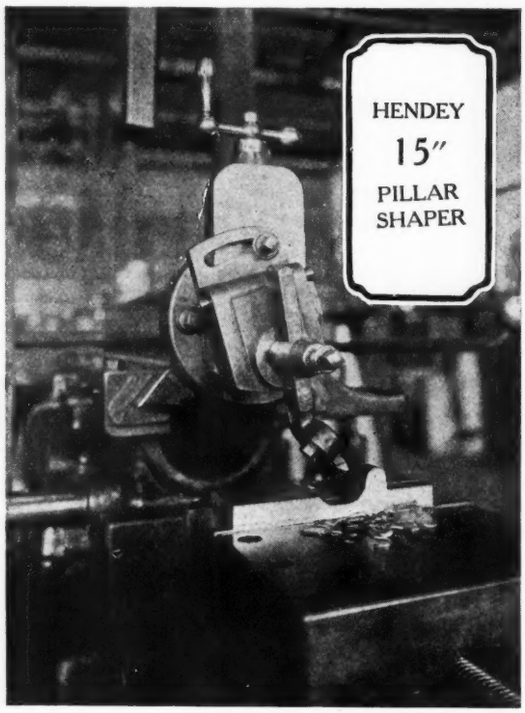
Send for Catalogue

BUILT BY

1856 **WICKES BROTHERS** 1920

190 Water Street, Saginaw, Mich., U. S. A.

Builders of Heavy Duty Plate and Structural Tools, Heavy Duty Engine Lathes, Special Production Lathes and Crankshaft Turning Equipment, Blue Print Machines.



The Power Behind the Ram

OF A Hendey Pillar Shaper is not alone contained in belt power, but in such features as exceptionally wide driving belts which act as an elastic cushion in absorbing the shock of the reversing ram travel, stroke of ram is fully adjustable while in motion; the patent friction clutch maintains uniform cutting speed and power the entire length of the stroke.

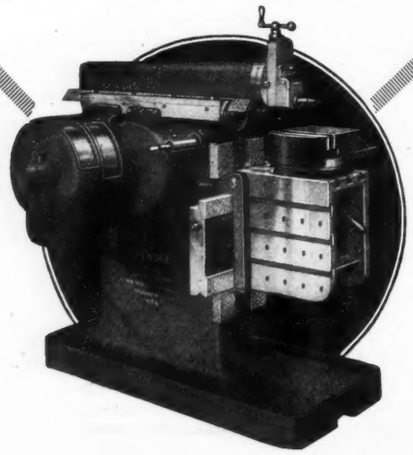
You as a buyer of machine tool equipment, should not only know the facts concerning Hendey shapers, but should have in your desk file the latest catalogs and information which we shall be glad to send at your request.

The Hendey Machine Co.
TORRINGTON, CONN.

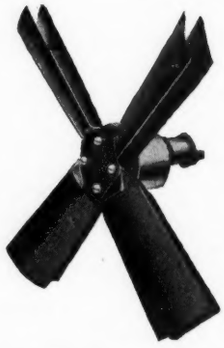
Singer Bldg., New York City; C. of C. Bldg., Rochester, N. Y.; Oliver Bldg., Boston, Mass.; 618 Washington Blvd., Chicago, Ill.

HENDEY

LATHES SHAPERS MILLERS



DETROIT
MULTIBLADE FANS
The Hurricane Under the Hood



High velocity air movement through the radiator. Extreme light weight coupled with unusual strength and rigidity.

Let us know your requirements for passenger cars, trucks or tractors.

DETROIT CARRIER & MFG. CO.
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PRESSED STEEL PARTS

OIL PANS
GEAR COVERS
GAS TANKS
MUFFLERS—DOOR HINGES
CRANK CASES

Thirty-seven years of successful business, fifteen acres of floor space, a strictly modern equipped plant, an organization of specializing experts are a few reasons why it will be to your advantage to let us furnish estimates from your blueprints.

Our name plate has always stood for quality, integrity and highly developed workmanship. We mean to live up to that reputation.

GEUDER, PAESCHKE & FREY CO.
1422-1700 St. Paul Ave., Milwaukee, Wis.

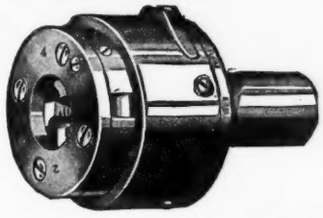
G.P.&F. SERVICE
"KNOWING HOW SINCE '81"

H&G

Screw Machine Products

Perhaps you buy your screw machine products outside. In that event, we would like to let you know what we can do. Our low manufacturing costs enable us to make attractive quotations. Prices submitted on blue prints or samples.

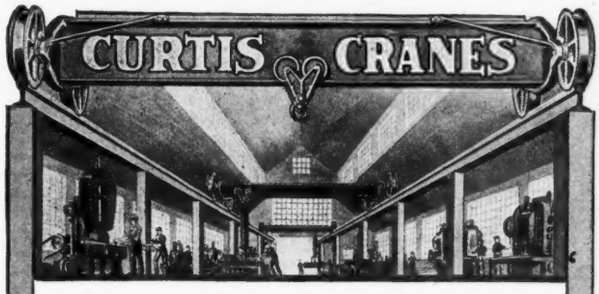
We operate one of the six largest screw shops in the country. To increase the production and the quality of our own work we built the H & G Die Head. The manufacture of this die head is now the most important branch of our industry, so you can rest assured it is a good one.



We believe it is the best self-opening die head on the market and if you will write us for details we will tell you of our shop test plan.

H & G Works—The Eastern Machine Screw Corp.

22-42 Barclay St.
New Haven, Conn.



CURTIS CRANES

Light, Safe and Easy to Move

Curtis I-Beam Cranes are preferred in many leading industrial plants for their safety and ease of operation. They are quickly erected at small cost.

Equipped with Hyatt Bearings throughout Made in various types, hand and pneumatic, in capacities up to 20,000 pounds and in spans up to 40 feet. All parts are extra strong, without excess weight.

Write for illustrated descriptive literature

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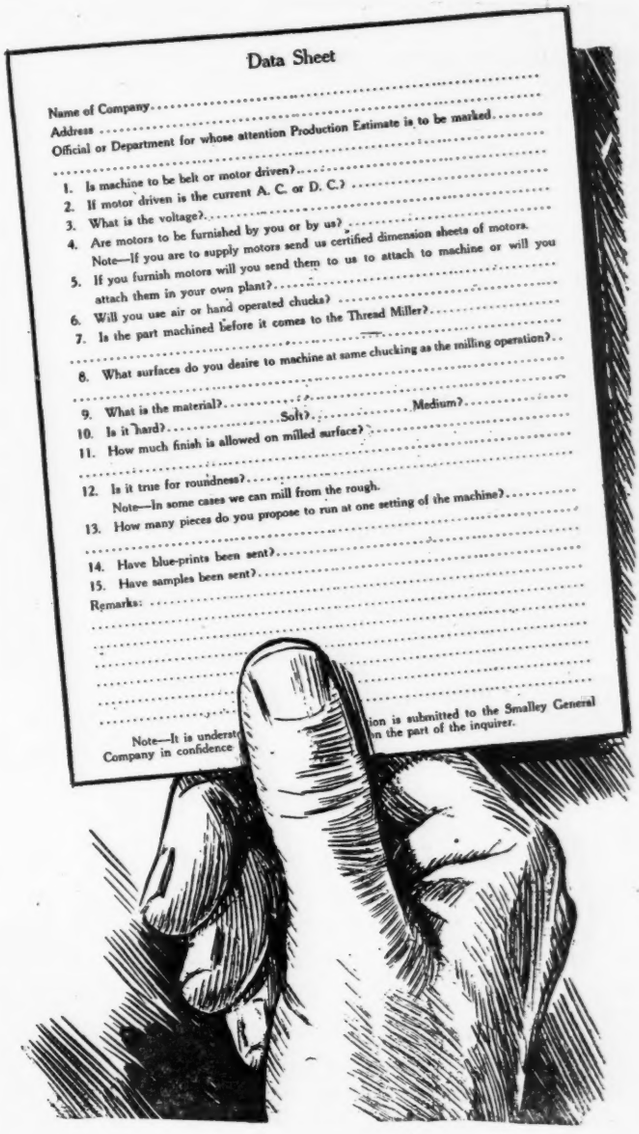
1636 Kienlen Ave. St. Louis, U. S. A.

Branch Office:
531-7 Hudson Terminal, New York City


Data Sheet
Name of Company
Address
Official or Department for whose attention Production Estimate is to be marked
1. Is machine to be belt or motor driven?
2. If motor driven is the current A. C. or D. C.?
3. What is the voltage?
4. Are motors to be furnished by you or by us?
Note—If you are to supply motors send us certified dimension sheets of motors.
5. If you furnish motors will you send them to us to attach to machine or will you attach them in your own plant?
6. Will you use air or hand operated chucks?
7. Is the part machined before it comes to the Thread Miller?
8. What surfaces do you desire to machine at same chucking as the milling operation?
9. What is the material?
10. Is it hard? Soft? Medium?
11. How much finish is allowed on milled surface?
12. Is it true for roundness?
Note—In some cases we can mill from the rough.
13. How many pieces do you propose to run at one setting of the machine?
14. Have blue-prints been sent?
15. Have samples been sent?
Remarks:
Note—It is understood that this information is submitted to the Smalley General Company in confidence on the part of the inquirer.

George:
Lets have the dope on this. We can get an S. G. guaranteed time study and Production Estimate for those drain plugs. The S. G. Thread Millers are big'uns

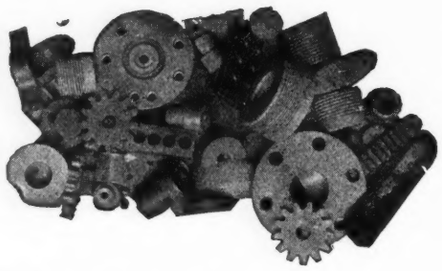
J. H.

SMALLEY-GENERAL THREAD MILLER

Smalley-General Co., Inc., *Machinery Builders*

Turnbull and Water Sts., Bay City, Mich.

VUL-COT Fibre



It's Really denser, tougher and longer wearing—

Perhaps that accounts for the really unusual development in the uses of *Vul-Cot* Fibre.

The ease with which it is sawed, machined, drilled, stamped and threaded has won it universal favor for use in thousands of mechanical parts that were formerly made of leather, rawhide, hard rubber, horn, etc.

It is readily procurable at all times, and much less expensive than most of the materials it replaces. Absolutely uniform in density, toughness and wear resistance, and perhaps the most adaptable insulating material known.

We supply it in sheets, rods or tubes, or we will gladly machine it to your specifications.

Write for a very interesting little booklet—"The Material with a Million Uses."

AMERICAN VULCANIZED FIBRE CO.
5 Equitable Building, Wilmington, Del.
SALES OFFICES
BOSTON PHILADELPHIA CLEVELAND CHICAGO
NEW YORK PITTSBURGH DETROIT ST. LOUIS
Complete Stock for Immediate Shipment at Chicago
Western Agents — *Western Electric Company*
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Canadian Agents — *Northern Electric Company* LIMITED
MONTREAL TORONTO WINNIPEG OTTAWA HALIFAX CALGARY REGINA VANCOUVER

VUL-COT Fibre

WIRE

IGNITION
AIRPLANE
SPRINGS

Everything in Wire

SEND FOR DESCRIPTIVE CATALOGUES

American Steel & Wire Company

CHICAGO
NEW YORK
CLEVELAND
PITTSBURG
DENVER
U. S. STEEL PRODUCTS CO.

THEIR "PEDIGREE"

Usually before buying a Dog you look up his Pedigree. The Armstrong Dog line traces its beginning way back to the time when the "Armstrong Boys" ran a lathe for a living and found out what a rotten thing the common cast lathe dog is. Hence the Armstrong Drop-Forged Dogs and Clamps, with Chrome Nickel Alloy Screws.

Write for Free Catalog

ARMSTRONG BROS. TOOL CO.
"The Tool Holder People."
299 N. Francisco Ave., Chicago, U. S. A.

Propeller Shaft Assemblies With Flexible Discs

for Passenger Cars, Trucks, Tractors and Motor Boats

PROTECT engine and transmission parts from the road shocks and vibration which are usually transmitted by the propeller shaft, and relieve the rear axle driving mechanism of the severe strains of starting, stopping and braking.

The Snead shaft is of electrically heat-treated, light-walled, nickel steel tubing, remarkably strong and unusually resilient.

The spiders which carry the discs are shrunk on the tubular shaft, secured by a hexagonal wedge and welded.

We solicit inquiries from car manufacturers and assemblers.

Address Dept. S.

SNEAD & COMPANY Jersey City, N. J.

SNEAD

CUSHION DRIVE

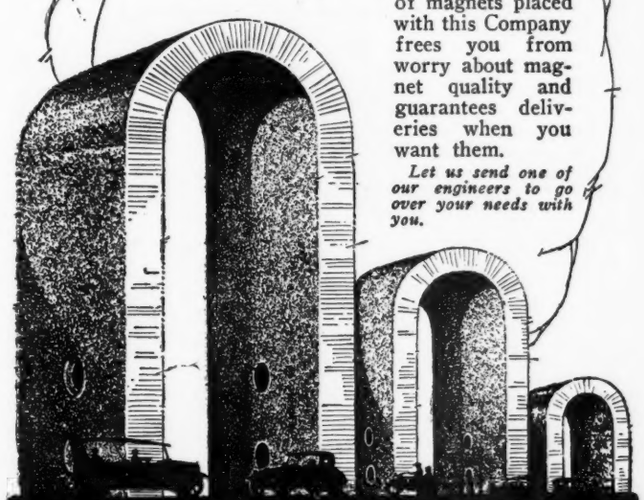
Takes the Self-Destruction Out of Your Car

PERMANENT MAGNETS

Your order for Stromberg-Carlson permanent magnets insures delivery of a flawless product which is uniformly forged, uniformly machined and uniformly heat treated.

A contract for your annual requirements of magnets placed with this Company frees you from worry about magnet quality and guarantees deliveries when you want them.

Let us send one of our engineers to go over your needs with you.



STROMBERG-CARLSON TEL. MFG. CO.

ROCHESTER, NEW YORK

Announcing

THE NEW 5 CYLINDER, AIR COOLED, SINGLE SLEEVE,

NEDOMA-NAJDER ROTARY MOTOR

Four-cycle type, each cylinder exploding each revolution of the motor. Five explosions per one revolution.

Weight complete 160 pounds.

5 Cylinders, air cooled, single sleeve.

Cylinders $2\frac{3}{4}$ bore, $3\frac{3}{8}$ stroke.

Twisting-skew sleeve motion.

Low speed motor.

3 oil pumps, dry crank-case.

Silent operation.

Perfect cooling.

Sleeve seizure eliminated.

Constant torque.

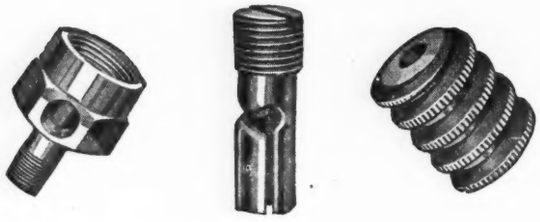
LIGHTEST AUTOMOBILE MOTOR ON THE MARKET PER HORSE POWER DEVELOPED

On exhibition during New York Show Week at the Commodore Hotel, Mezzanine Floor

NEDOMA-NAJDER MOTOR SYNDICATE

Offices: Suite 243, Metropolitan Tower 1 Madison Ave., New York

CORBIN



CORBIN AUTOMATIC SCREW MACHINE PRODUCTS

Special parts for Automobiles, Carburetors, Magnetos, Electrical Instruments, Spark Plugs, Tools, and turned parts of every description.

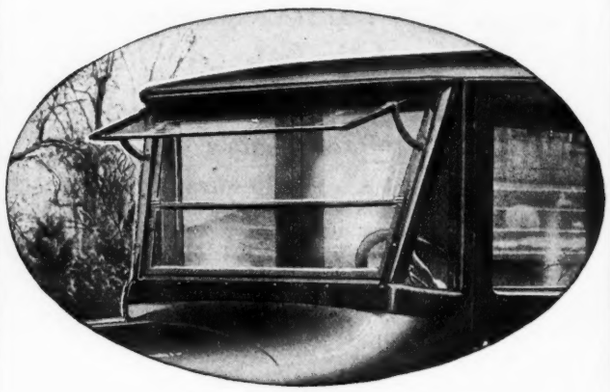
We shall be pleased to furnish quotations immediately upon receipt of samples, blueprints, or specifications.

Corbin Screw Corporation

American Hardware Corporation, Successor

227 High Street New Britain, Conn.

Branches:
New York Chicago Philadelphia



Crystal Sheet Glass

The most practical flat glass for closed cars or body fittings. It is lower priced than plate glass and is just as serviceable.

It can be furnished in thicknesses not exceeding 3/16".

By Government Test 3/16" Crystal Sheet Glass is stronger than ¼" polished plate.

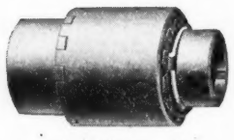
We make thin glass for Headlights, Clock Faces, Speedometers, Oil Gauges, etc.

American Window Glass Co.

General Offices: Farmers Bank Bldg., Pittsburgh, Pa., U. S. A.

ACME MAGNETO COUPLING

Perfectly Balanced



8 Points of Superiority

1. Perfectly Balanced
2. Adjusted to 132 Positions
3. Flexible
4. Self-Aligning
5. Durable
6. Noiseless
7. Eliminates Back Lash
8. Accurate Timing

THE Acme Universal Magneto Coupling is perfectly balanced. It is so accurately constructed and machined that back lash is entirely eliminated and the bearings are exposed to minimum wear.

It is made of cold drawn steel and consists of only four parts: driving hub, center member, magneto hub and retainer rings. There is nothing to wear loose or get out of order and it is universal in application.

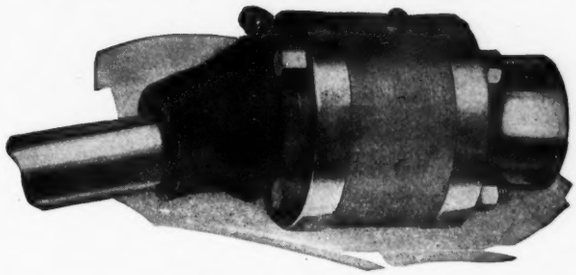
The Acme Universal Magneto Coupling has been adopted as standard equipment on a number of automobiles, trucks, tractors, motorcycles and marine engines. Length of hubs and center member and diameter of shafts can be made to meet your specifications.

Write for our illustrated catalog containing full information. We will be glad to submit quotations on request.

Acme Motor Parts Corporation

Milwaukee Wisconsin

"STANDARD" Universal Joints



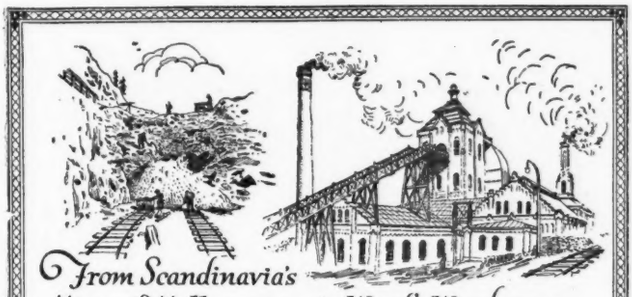
Double assemblies as shown here cover all light and heavy-duty requirements and are being widely used on leading trucks.

Because of their refined internal structure, Standard Universal Joints are being adopted as standard equipment on government and other prominent trucks.

All parts of our joints are renewable in case of wear and every joint is turned out of our plant dust-tight and self-contained with oil and grease chambers.

The Universal Machine Co.

Box 217 BOWLING GREEN, OHIO



From Scandinavia's Mines & Mills comes to Ward's Warehouses

the World's Finest High Carbon Strips

Tempered & Highly Polished *and* Bright Cold Rolled to take a high temper.

Suitable for fine springs, cutters, saws, instrument parts, diaphragms, tapes, etc

USED BY
Watch, Typewriter, *and* Instrument Manufacturers. Automatic Machinery, Accounting Machine Parts, *etc.*

ENORMOUS STOCKS AVAILABLE THROUGH ALL WAREHOUSES

Edgar T. Ward's Sons Co.

BOSTON · NEW YORK · BROOKLYN · NEWARK · PHILADELPHIA · PITTSBURGH
CLEVELAND · DETROIT · CHICAGO · ST. LOUIS · MILWAUKEE

NO PAPER FOR THE CURRENT TO JUMP THROUGH

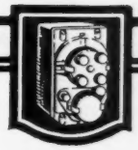
The Condenser in the Teagle Inductor-Type Magneto is insulated with highest-quality sheet mica—indestructible under heat, pressure, action of years. Capacity not affected by temperature.

The Condenser is stationary. This means ample space, no holes, no breaking down.

SIMPLICITY-RUGGEDNESS
EFFICIENCY-ECONOMY

Always associate these Qualities with

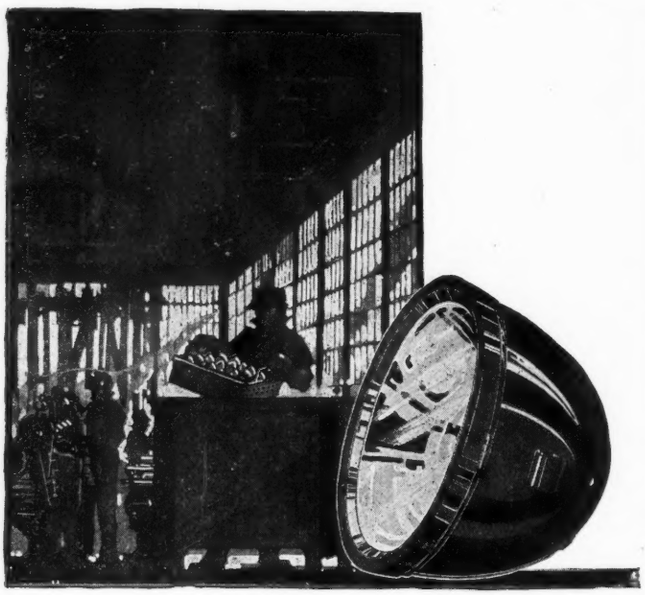
TEAGLE MAGNETO

A BETTER SPARK  IN A SIMPLER WAY

For other Teagle features write

1125 Oregon Avenue today

CONFORMS TO S.A.E. STANDARDS
THE TEAGLE COMPANY CLEVELAND, O.



No Sediment in Cleaning Tank

AN auto accessory manufacturer now cleans sheet steel headlights, etc., with Oakite materials before japanning —because better working conditions are secured as well as satisfactory cleaning results.

With the cleaning material formerly used, it was necessary to entirely replace the solution in the cleaning tank every three weeks, due to heavy sediment that formed in bottom of tank.

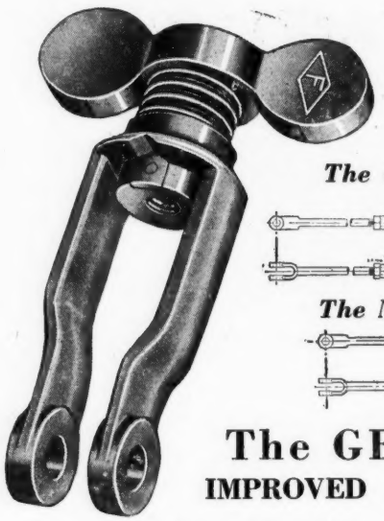
Oakite leaves no sediment. It is entirely soluble. A small addition of Oakite every day keeps the solution at proper strength.

This Advertisement is one of a series based on actual occurrences

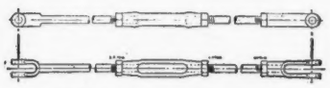
Frequent draining and cleaning of tank now eliminated. Less labor. No waste of cleaning materials.

May We Serve You, Too?

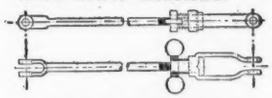
OAKITE
MANUFACTURED BY
OAKLEY CHEMICAL CO.
28 THAMES STREET · NEW YORK



The Old Method



The New Method



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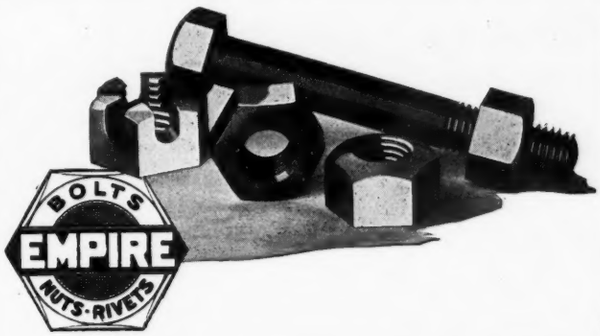

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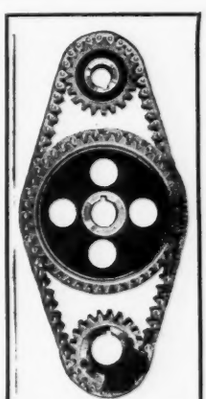

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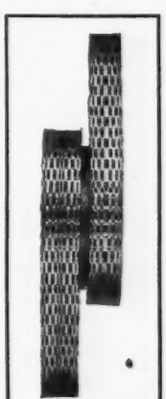

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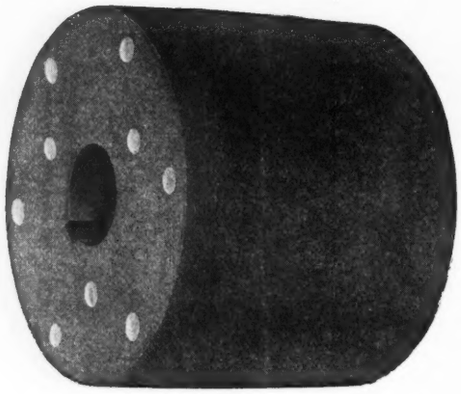

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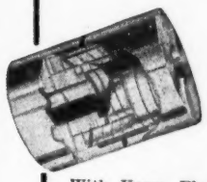

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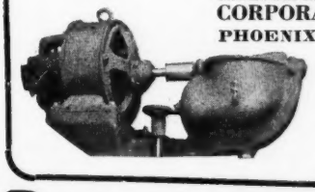

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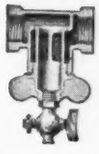

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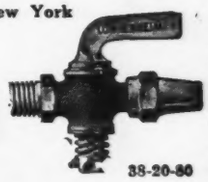

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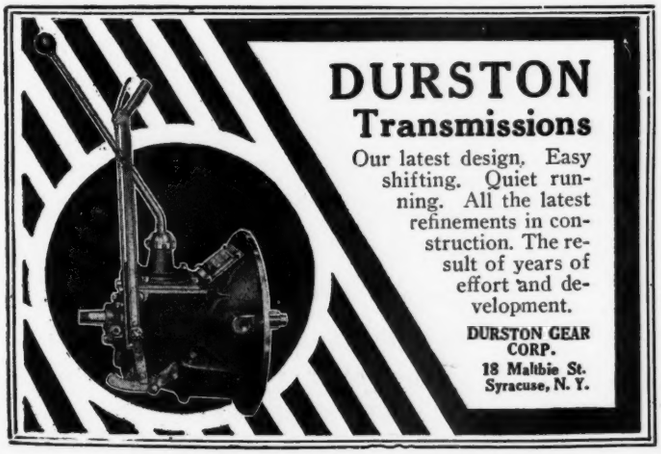

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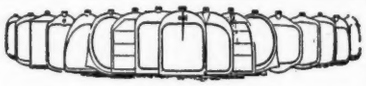

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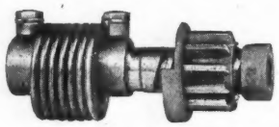

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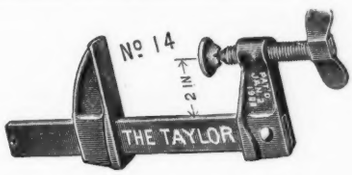

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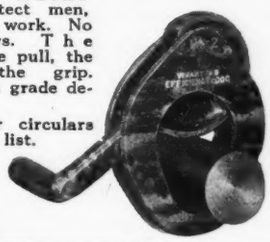

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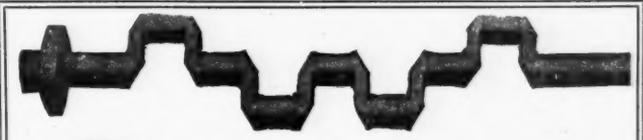

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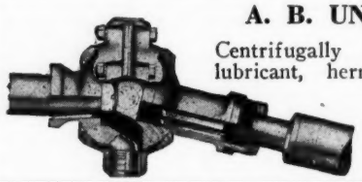
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Yale Made is Yale Marked
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American Amplifying Gauge
The American Amplifying Gauge will lead you to short cuts in gauging that give greater efficiency. Full information on request.

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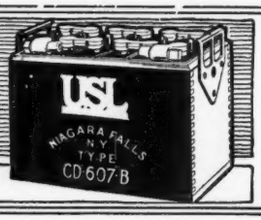

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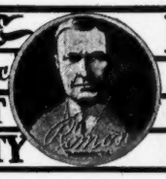
35 WARREN ST
NEW YORK CITY

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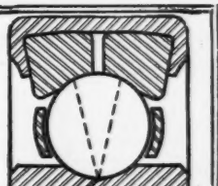

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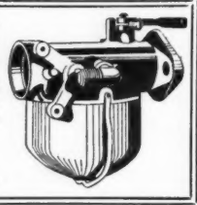

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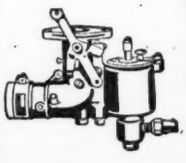

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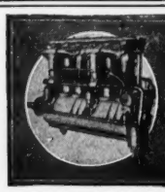

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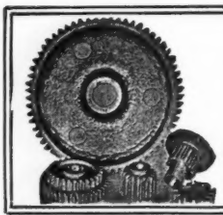

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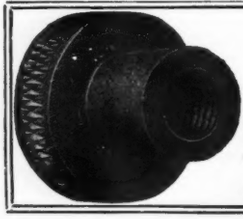

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can drive 800 to 2000 screws per hour—just as fast as he can get the work on the table. Write for information—write today.

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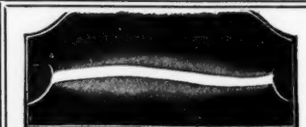

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We manufacture a complete line of Screw Machines and Turret Lathes. Our Engineering force is at your service. Write for catalogs.
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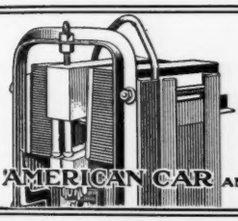
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If it's a rush job—a fussy job, or any kind of a job for Tools, Dies, Jigs and special machinery—the Atcheson people will get it out on time—and it will be right. Consultation will incur no obligation.
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Size ¼ to 2⅝ PRODUCTS
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Let us quote you Prompt Deliveries
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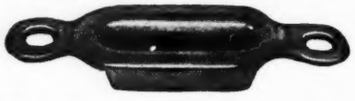
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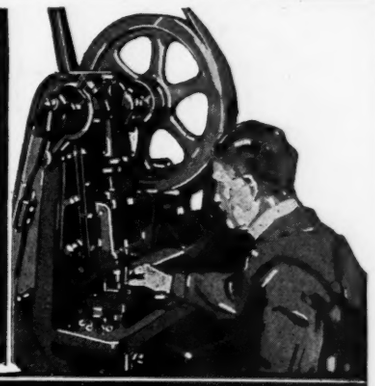

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The items appearing in these columns form a part o f the inquiries received by our Contract Work Service Department during the past three weeks. Manufacturers or concerns interested in these or similar inquiries can secure full information as to how this service is operated by communicating with the Contract Work Service Department, Automotive Industries, 239 W. 39th Street, New York.

6784 A foreign correspondent manufacturing high class motor bodies and owning general assembly work, situated near London, England, would like to get in touch with concerns offering agencies or rights for United Kingdom in good selling lines, chassis, accessories, or components or agricultural machine, etc.

6785 Would like to take on the representation for export of a popular priced car. The inquirer states that since a great many of the older established factories are already represented, it may be necessary to refer to younger plants.

6786 This correspondent located in Calcutta, India, would like to get in touch with manufacturers or jobbers of automobiles or automobile equipment, who desire to establish trade relations with India and the East.

6787 Has recently patented a fuel heating or vaporizing attachment for automobiles of the L-head type and for the Ford motor in particular. The device is claimed to be simple in construction and could be put on the market at little expense. Would like to dispose of invention on a royalty basis or will consider other arrangements.

6788 Wishes to get in touch with concerns who are equipped to handle and quote on dies, gear cutting, metal stampings, screw machine work, coil springs.

6789 Would like to communicate with concerns who are equipped to handle and quote on malleable iron, grey and steel castings, gear cutting, grinding, lathe and milling machine work, metal stamping, wood and metal patterns, punch press work, screw machine and sheet metal work, coil springs, tool and die work.

6790 A company located in New York State is interested in receiving quotations with a view of sub-letting to outside concerns on malleable castings.

6791 Concern located in Elmira, N. Y., would like to get in touch with concerns who are in a position to quote on and to supply malleable iron castings and plier forgings.

6792 Wants to communicate with concern equipped to handle and quote on commercial and passenger bodies; also fire apparatus and bus bodies, malleable iron castings—brake rod assemblies and windshields.

6793 This company located in the Middle West wishes to get in touch with those who are equipped to handle and quote on malleable agricultural universal joints for ¾" shaft.

6794 Is interested in receiving quotations with a view of sub-letting to outside concerns, contract basis, on small grey iron castings, mild steel forgings (cups, etc.). Screw machine work (small parts); also small flanges similar to magneto couplings.

6795 Corporation located in New York City would like to get in touch with concerns who are equipped to handle and quote on castings (kind not specified). Forgings, machine parts, metal stampings, plating and japanning; also screw machine parts.

6648 Is located in New York City; has invented and patented a new clamp. It has been tested out by various firms with considerable success; seeks manufacturing and marketing co-operation.

6649 Has secured patent in 1919 on a multiple-passage reflector, for an automobile light, and would like to have the device manufactured on a royalty basis or will consider other arrangements.

6650 A mechanical engineer located in Dayton, Ohio, has invented a variable speed transmission that, from an engineer's point of view, is most efficient and economical, wishes to get in touch with concerns or individuals who are financially able to assist in manufacturing and marketing.

6651 A motors company located in the South has developed an automobile tool—a spring leaf spreader, which is especially adapted to Ford cars, having springs running crosswise.

6652 Has invented and patented a coin-controlled gasoline dispensing device that can be made by any concern having a foundry and machine shop. Desires to make royalty basis arrangements or otherwise.

6653 A Western correspondent has recently patented a burglar-proof steering wheel which operates by locking the wheel; wishes to sell through royalty basis arrangements or will consider any fair proposition.

6654 This number relates to new improvements in attachment for automobiles, particularly Fords, for the purpose of extracting tires from mudholes or sand, when stuck. Will make a royalty basis arrangement or otherwise.

6655 An inventor in Madison, Wis., has developed an automobile pump, with the idea of making the task of washing an automobile more easy. This is a suction pump arrangement that is to be applied to left hind-wheel after same has been jacked up. Will consider royalty basis arrangement or otherwise.

6656 Has developed a new traction device for automobiles and trucks to provide safe and sure traction in all mud, sand and snow. Seeks financial co-operation.

6657 A Southern correspondent has invented an improved spark plug; also has patent pending on a new spark intensifier. Seeks financial assistance.

6796 Holds patent rights and wants concern to manufacture on contract a radiator testing tank and work bench with a lowering, raising and revolving platform. Tank of galvanized iron; framework of wood; can be knocked down for shipping; platform made of cast and angle iron.

6797 Is in the export business representing several concerns of France, Belgium and Spain, and knows of a demand for chassis for voiturettes to be made as per their own drawings (motor not included), would like to get in touch with a firm desiring to build on a fair basis.

6798—This correspondent, located in New York City, is looking for a high grade single cylinder gasoline engine, 2 to 5 horsepower, for isolated lighting plants.

6799 Has invented an auto headlight. The principle of the invention is to stop the glare from where it comes by the aid of scientifically designed glass shades that fit under the bulbs and stop the blinding rays that are difficult to cope with. Will let out on a royalty basis or consider other arrangements.

6800 This company has a grease retainer that is claimed to have had great success. The article is patented and being manufactured in the far West. Eastern representation and manufacturing co-operation is desired.

6801 Has invented an automatic automobile lock which works without the aid of a key. The lock stops the engine and locks the car simultaneously by the act of pushing a button. Will let out on a royalty basis or otherwise.

6802 Is interested in marketing a 15-20 h.p. railway motor which is a 4 cycle, 2 cylinder, air-cooled motor rating not over 1000 r.p.m., to be compact, light, simple as possible; friction clutch, 2 speed planetary transmission, low gear, direct drive on high without reversing feature. Manufacturing and marketing co-operation desired.

6804 Has a new and improved roller bearing, in which the friction is so completely eliminated that it will run without any lubrication. Manufacturing co-operation is desired.

6805 A Pacific coast correspondent has a patent manifold for internal combustion engine, (patented Nov. 8, 1910) wishes to dispose of device on a royalty basis or will consider other arrangements.

6806 Is the inventor of a quick detachable spark plug for automobiles, (patent applied for) would like to get in touch with some one who will manufacture and market the device on a royalty basis.

6807 Has patented a valve device for rotating the valves of internal combustion engine. Would like to let out on a royalty basis or will consider other arrangements.

6808 Residing in the Middle West, has recently obtained patent on a radiator cap, seeks disposal of invention on a royalty basis or otherwise.

6809 Has invented and secured patent on an automatic graphite lubricator, would like to have the device manufactured on a royalty basis by a reliable firm. Invention has been well tried out.

6810 Oakland, Cal., correspondent has invented a right-of-way signal for automobiles, trucks, etc., which seems to have several interesting features. Inventor seeks manufacturing and marketing co-operation.

6811 Wishes to market either by a royalty basis arrangement or otherwise, two devices he has invented, one an air washer, the other a clutch check, which is developed to prevent clutch from grabbing.

6812 Of San Francisco, Cal., has invented and secured patent on an auto pump support. Will dispose of on a royalty basis or otherwise.

6813 A company in Middle West would like to get in touch with concerns who are equipped to handle gear cutting, lathe and milling machine work, tractor manufacturing, sheet metal work, Transmission manufactured complete, also Worm Drive Rear Axle made up complete, in accordance with specifications.

6814 A Western concern is interested in receiving quotations with a view of subletting to outside concerns, malleable castings.

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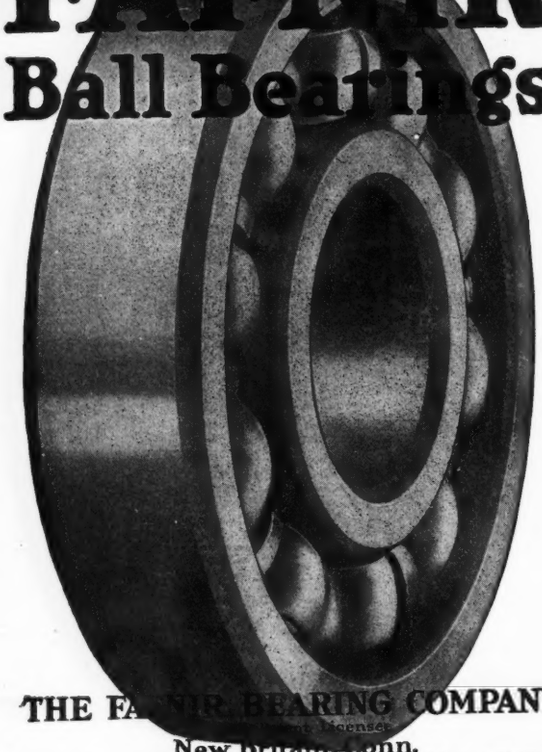

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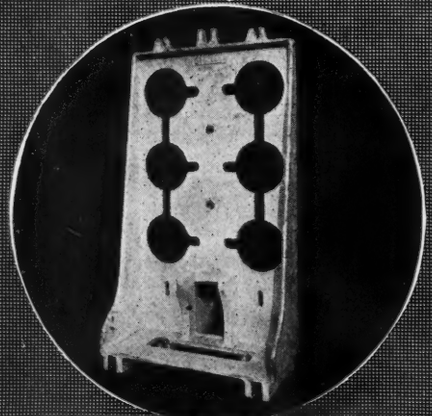

Aluminum Frame
Cast for the General Electric Co. of Schenectady.
Actual size 30" x 18", weight is 40 lbs. *Illustration from an unretouched photo.*

Alloy Foundry and Machine Corp
NEW ROCHELLE, NEW YORK

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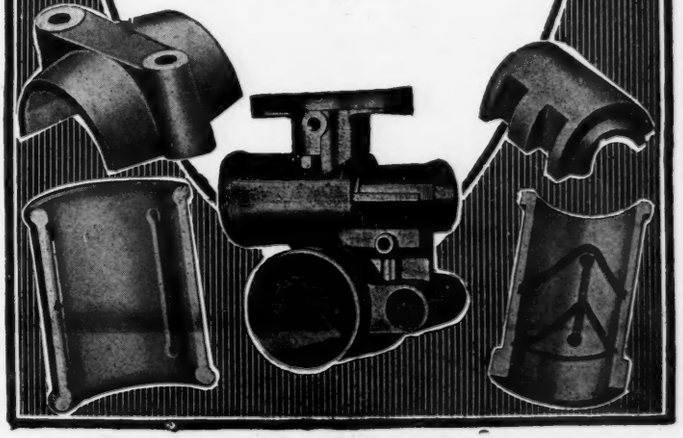

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